

HYDROIDS FROM THE KERGUELEN AND CROZET SHELVES,  
COLLECTED BY THE CRUISE MD.03 OF THE *MARION-DUFRESNE*

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(With 12 figures and 2 tables)

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ABSTRACT

Thirty-four species of hydroids are described from the Kerguelen and Crozet groups of islands, including two new species: *Halecium dufresneae* and *Zygophylax crozetensis*. Among them are five cosmopolitan species. The rest show affinities partly with the cold-temperate Magellan Region of South America, and partly with Antarctica. The fauna is considered to be subantarctic in nature.

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INTRODUCTION

The cruise MD.03 of the *Marion-Dufresne* during the period 18 March to 28 April 1974 to the Kerguelen and Crozet groups of islands was intended as a preliminary reconnaissance of the area to serve as a basis for a more detailed survey. The cruise was highly successful in the quantity and variety of benthic invertebrates taken, and although the subsequent cruises MD.04 (1975) and MD.08 (1976) have now been completed, it may be some time before the hydroid material is all sorted and worked up. It was felt that the publication of the present results should not be delayed.

The cruise was financially and logistically supported by the Terres Australes et Antarctiques Françaises, Paris. The bulk of the material and the types of the new species will be deposited in the Muséum National d'Histoire Naturelle, and a few duplicates are being retained at the South African Museum.

The cruise MD.03 was described by the Chef de la Campagne, J. C. Hureau (1976), who also gave a complete station list and a chart of the voyage. The positions of the stations yielding hydroid material are, however, repeated here for convenience.

The Kerguelen Shelf lies in the southern Indian Ocean at approximately 50°S and 70°E. Kerguelen is the largest island, Heard and MacDonald lying about 644 km to its south-east. The depths from which hydroids were taken range from 6 to 790 m, the abyssal dredgings from over the edge of the plateau yielding no hydroid material.

The Crozet Shelf (including among others the Ile de la Crozet, Île de la Possession and Île aux Cochon) lies some 1 930 km to the west of Kerguelen, and hydroids were dredged from depths of 110 to 400 m.

#### STATION LIST

- 2/6. E. Kerguelen; 4.4.74; 49°30,7'S 70°44,7'E; 115 m: *Zygophylax crozetensis*, *Symplectoscyphus subarticulatus*.
- 2/7. E. Kerguelen; 4.4.74; 49°33,2'S 70°47,1'E; 130 m: *Symplectoscyphus subarticulatus*.
- 3/10. E. Kerguelen; 5.4.74; 49°28,5'S 71°52,8'E; 650 m: *Eudendrium tottoni*, *Modeeria rotunda*, *Opercularella belgicae*, *Lafoea dumosa*, *Plumularia insignis*.
- 3/11. E. Kerguelen; 5.4.74; 49°25,4'S 71°51,7'E; 620–650 m: *Eudendrium tottoni*, *Modeeria rotunda*, *Filellum serratum*, *Lafoea dumosa*, *Symplectoscyphus subdichotomus*, *Plumularia insignis*.
- 7/22. N.E. Heard; 7.4.74; 52°12,7'S 75°38,4'E; 525–560 m: *Staurotheca dichotoma*, *Plumularia insignis*.
- 8/24. N. Heard; 8.4.74; 52°58,0'S 73°42,0'E; 123 m: *Campanularia norvegiae*, *Staurotheca dichotoma*, *Sertularella picta*, *Symplectoscyphus elongatus*, *S. mawsoni*.
- 8/25. N.E. Heard; 8.4.74; 52°59,4'S 73°38,0'E; 90 m: *Modeeria rotunda*, *Staurotheca dichotoma*, *Symplectoscyphus elongatus*, *S. subdichotomus*, *Schizotricha unifurcata*.
- 9/26. Heard, Atlas Cove; 8.4.74; 15–20 m: *Sertularella picta*, *Schizotricha unifurcata*.
- 9/27. Heard, Atlas Cove; 8.4.74; 6 m: *Sertularella picta*.
- 10/30. S.S.E. MacDonald; 9.4.74; 53°06,7'S 72°50,1'E; 255 m: *Modeeria rotunda*, *Symplectoscyphus mawsoni*, *Schizotricha unifurcata*.
- 11/31. W. Heard; 9.4.74; 53°20,3'S 72°29,2'E; 790 m: *Staurotheca dichotoma*.
- 14/44. W. Kerguelen; 13.4.74; 49°48,4'S 64°57,9'E; 250 m: *Symplectoscyphus plectilis*, *S. subdichotomus*.
- 14/45. W. Kerguelen; 13.4.74; 49°45,8'S 64°50,6'E; 262 m: *Hydrodendron arborea*, *Staurotheca dichotoma*, *Symplectoscyphus subarticulatus*.
- 17/50. N.W. Kerguelen; 14.4.74; 47°24,9'S 66°04,0'E; 585 m: *Kirchenpaueria triangulata*, *Plumularia insignis*.
- 18/52. N.W. Kerguelen; 15.4.74; 47°42,2'S 68°07,1'E; 243 m: *Modeeria rotunda*, *Plumularia insignis*.
- 21/57. N.E. Kerguelen; 15.4.74; 48°29,7'S 70°55,4'E; 345–360 m: *Zygophylax crozetensis*, *Staurotheca dichotoma*, *Symplectoscyphus subdichotomus*, *Plumularia insignis*.
- 22/58. N.E. Kerguelen; 16.4.74; 48°58,5'S 70°51,1'E; 90–105 m: *Eudendrium rameum*, *Halecium tenellum*, *Zygophylax crozetensis*, *Staurotheca dichotoma*, *Sertularella picta*, *Symplectoscyphus subdichotomus*, *Schizotricha unifurcata*.
- 23/59. S.E. Kerguelen; 16.4.74; 49°59,2'S 70°01,9'E; 158 m: *Eudendrium rameum*, *Staurotheca dichotoma*, *Plumularia insignis*, *Schizotricha unifurcata*.
- 24/61. S.E. Kerguelen; 17.4.74; 50°10,7'S 69°48,7'E; 195 m: *Tulpa diverticulata*, *Staurotheca dichotoma*, *Plumularia insignis*.
- 26/63. Crozet, chenal des Orques; 20.4.74; 46°21,5'S 51°55'E; 230 m: *Modeeria rotunda*, *Phiale chilensis*, *Halecium dufresneae*, *Filellum serratum*, *Zygophylax crozetensis*, *Campanularia* sp., *Staurotheca dichotoma*, *Symplectoscyphus curvatus*, *S. subdichotomus*.

- 26/64. Crozet, chenal des Orques; 20.4.74; 46°24'S 51°59'E; 180 m: *Eudendrium rameum*, *Modeeria rotunda*, *Phialella chilensis*, *Hydrodendron arborea*, *Grammaria abietina*, *Halisiphonia ?nana*, *Hebella striata*, *Zygophylax crozetensis*, *Campanularia* sp., *Tulpa diverticulata*, *Staurotheca antarctica*, *S. dichotoma*, *Sertularella picta*, *Symplectoscyphus curvatus*, *S. elongatus*, *S. subdichotomus*, *Oswaldella bifurca*, *Plumularia insignis*.
- 26/65. Crozet, chenal des Orques; 21.4.74; 46°23,3'S 51°58,3'E; 165 m: *Symplectoscyphus subdichotomus*.
- 28/71. Entre Possession et Cochons; 22.4.74; 46°18,1'S 51°29'E; 400 m: *Halecium delicatulum*, *H. jaederholmi*, *Sertularella picta*, *Symplectoscyphus subdichotomus*.
- 30/73. Entre Possession et Cochons; 22.4.74; 46°02,3'S 50°50,2'E; 187 m: *Tulpa diverticulata*, *Staurotheca antarctica*, *S. dichotoma*, *Symplectoscyphus subdichotomus*, *Plumularia insignis*.
- 31/74. Entre Possession et Cochons; 22.4.74; 45°57,2'S 50°32,8'E; 110 m: *Modeeria rotunda*, *Phialella chilensis*, *Halecium jaederholmi*, *Hydrodendron arborea*, *Grammaria abietina*, *Zygophylax crozetensis*, *Silicularia rosea*, *Tulpa diverticulata*, *Staurotheca antarctica*, *S. dichotoma*, *Sertularella geodiae*, *S. picta*, *Symplectoscyphus subdichotomus*.

## SYSTEMATIC SECTION

### Family Eudendriidae

#### *Eudendrium rameum* (Pallas, 1766)

*Eudendrium rameum*: Allman, 1888: 4, pl. 2 (figs 1-2). Vervoort, 1946: 150, figs 60-61. Vervoort, 1972a: 21.

#### Stations

22/58-C; 23/59-E; 26/64-P. All fertile.

#### Description

Stiff, bushy colonies with thick, fascicled stems reaching a maximum height of 120 mm and a diameter of 5 mm at base, branching irregularly and in all planes. Maximum diameter of unfascicled stems 0,26 mm. Perisarc annulated on origin of branches, partly or completely on hydranth pedicels, and at other irregular intervals, brown in colour. Hydranth with about 20 tentacles, with abundant large nematocysts on hypostome and in nettle ring.

Male gonophores borne on non-atrophied hydranths, one- to two-chambered. Female gonophores borne on non-atrophied hydranths, young ones with unbranched spadix.

Large nematocysts: microbasic euryteles very similar to those illustrated by Weill (1934, fig. 66);  $19,8 \times 9,0 - 25,8 \times 10,8 \mu\text{m}$ , discharged shaft 20,4-24,0  $\mu\text{m}$ .

#### Remarks

Totton (1930) considered that all Antarctic material of *Eudendrium* should be included in one species: *E. antarcticum* Totton = *E. tottoni* Stechow. Totton included Jäderholm's (1905) material from South Georgia doubtfully in this species; and it presumably follows that Allman's (1888) material from

Kerguelen Island should be included too, since Jäderholm said that the two samples were very similar.

In the present collection, however, there are almost certainly two species of *Eudendrium*, a delicate form with a flexuous stem (*E. tottoni*) and a stiff bushy form which the author has assigned to *E. rameum*. Unfortunately the former is not well enough preserved for examination of nematocysts, which must provide the final evidence, but the latter possesses abundant large micro-basic euryteles, a type which according to J. Bouillon (personal communication) is characteristic of *E. rameum*. The bushy colony is also very similar to Vervoort's (1946) illustration of *E. rameum*.

*Eudendrium tottoni* Stechow, 1932

*Eudendrium ramosum*: Vanhöffen, 1910: 288, fig. 13.

*Eudendrium antarcticum* Totton, 1930: 140.

*Eudendrium tottoni*: Rees & Thursfield, 1965: 62.

*Stations*

3/10-E; 3/11-A. (Both fertile.)

*Description*

Delicate colonies reaching a height of about 16 mm. Stems unfascicled or weakly fascicled at base, flexuous, difficult to distinguish from hydrorhiza, branching irregularly, about 0,08 mm in diameter. Groups of annulations present on origins of branches and rarely at other points. Hydranths poorly preserved.

Female gonophores with unbranched spadix arching over a single egg. Male gonophores one- to two-chambered.

*Remarks*

The hydranths in this species are too poorly preserved to distinguish structure or number of tentacles, though the gonophores have survived. The tentacles of the fertile hydranths appear to be persistent. *E. tottoni* is known from a number of localities in the Antarctic.

Family **Campanulinidae**

*Modeeria rotunda* (Quoy & Gaimard, 1827)

*Stegopoma fastigiatum*: Vervoort, 1972a: 42.

*Modeeria rotunda*: Edwards, 1973: 573, figs 1-3. Millard, 1975: 137, fig. 45A.

*Stations*

3/10-C; 3/11-G; 8/25-D; 10/30-C; 18/52-B; 26/63-B; 26/64-G; 31/74-M.

*Description*

Many infertile colonies epizootic on other hydroids. Hydrotheca and pedicel extremely variable in size.

*Remarks*

This is a new record for this area. The species has, however, been recorded from the south-western Atlantic at a very similar latitude (Vervoort 1972a).

*Opercularella belgicae* (Hartlaub, 1904)

## Figure 1B

*Campanulina belgicae* Hartlaub, 1904: 10, pl. 1 (figs 8-9). Vanhöffen, 1910: 308, fig. 28.

*Opercularella belgicae*: Leloup, 1974: 4, fig. 2.

*Opercularella* sp. Vervoort, 1972a: 42, fig. 11b, c.

*Station*

3/10-F.

*Description*

A sparse colony without gonothecae growing on a polyzoan. Colony stolonial. Pedicels of very variable length, with 2-4 spiral annulations at base, merging smoothly into hydrotheca. Hydrotheca deep, widest at opercular base, with about eight opercular segments and a delicate diaphragm.

*Measurements* (mm)

Total height, pedicel + hydrotheca	.. .. .	1,00-6,90
Hydrotheca, height from diaphragm to tip of operculum	.. .. .	0,46-0,57
maximum diameter	.. .. .	0,16-0,20

*Remarks*

Vervoort's material (1972a: *Opercularella* sp.) from Magellan is very similar to the present material, though with shorter pedicels. It appears to fall within the range of variation of *O. belgicae*.

The generic name of this species is still provisional pending knowledge of the gonophore.

*Phialella chilensis* (Hartlaub, 1905)

## Figure 1A

*Campanulina chilensis* Hartlaub, 1905: 589, fig. L<sup>2</sup>, M<sup>2</sup>, N<sup>2</sup>. Naumov & Stepaniants, 1962: 76, fig. 3. Leloup, 1974: 3, fig. 1.

*Phialella chilensis*: Vervoort 1972a: 38, fig. 10.

*Stations*

26/63-H; 26/64-Q; 31/74-N.

*Description*

Slender stems, a few lightly fasciated at base, branching sympodially and reaching a maximum height of 10,8 mm. Stem closely annulated in basal half of each internode and smooth in distal half, as illustrated by Vervoort (1972a) rather than by Hartlaub (1905). Hydrothecal pedicels completely annulated or with a smooth area in the centre of the longer ones. Hydrotheca as in previous descriptions. Gonothecae absent.

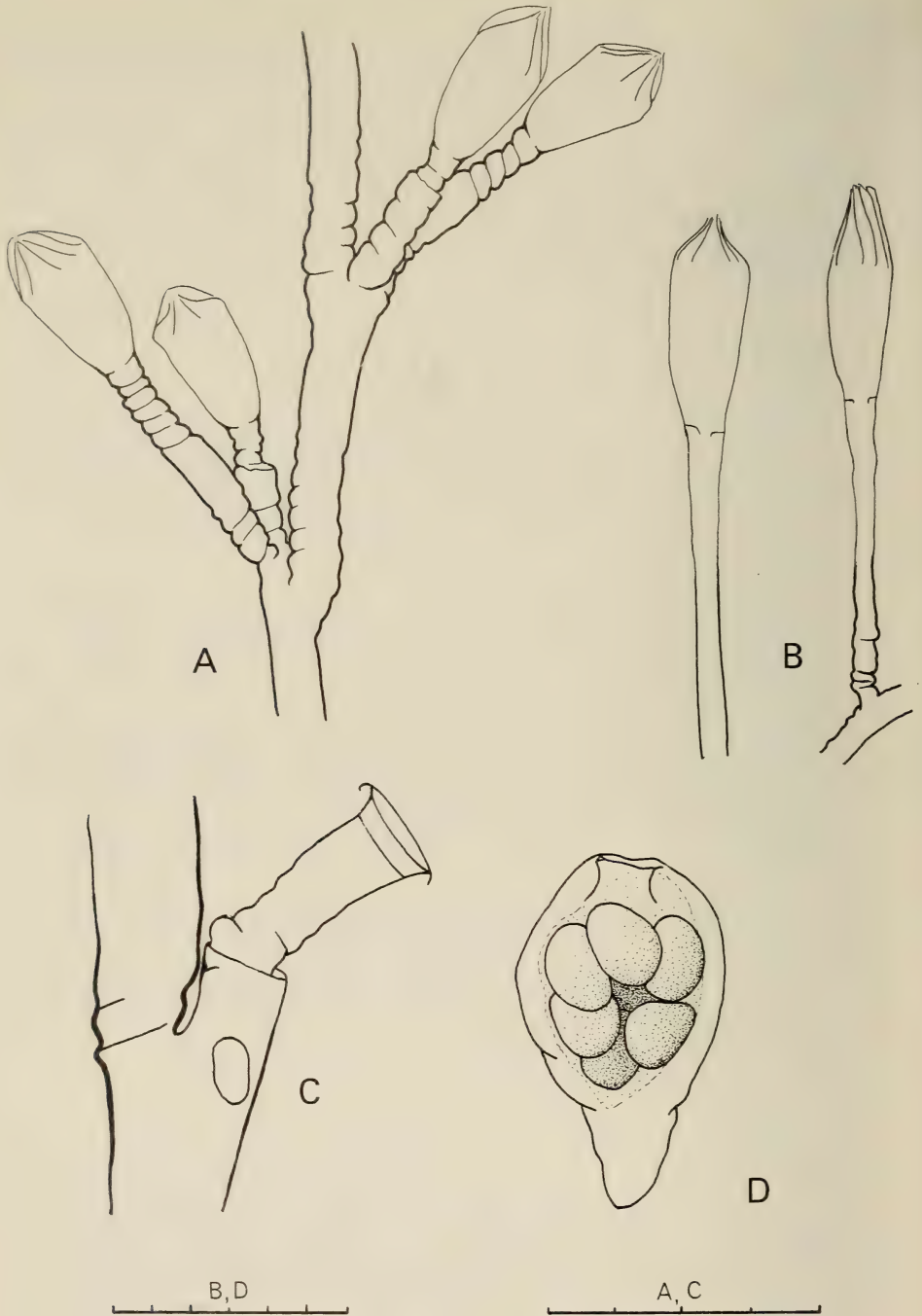


Fig. 1.

*Phialella chilensis* (Hartlaub). A. Part of stem with hydrothecae.  
*Opercularella belgicae* (Hartlaub). B. hydrothecae.  
*Halecium delicatulum* Coughtrey. C. Hydrophore. D. Gonophore.

Scale in mm/10.

*Measurements* (mm)

Hydrotheca, height from diaphragm to tip of operculum ..	0,21-0,29
maximum diameter .. .. .	0,11-0,14

*Remarks*

This species is well known from the Antarctic and Subantarctic, especially from the South American area. This is the first record from the Kerguelen region.

Family **Haleciidae***Halecium delicatulum* Coughtrey, 1876

## Figure 1C-D

*Halecium delicatulum*: Ralph, 1958: 334, figs 11e, h-n, 12a-p. Naumov & Stepaniants, 1962: 94, fig. 16. Vervoort, 1972b: 341, fig. 2a.

*Halecium antarcticum* Vanhöffen, 1910: 317, fig. 34. Billard, 1914: 7, fig. 5. Totton, 1930: 144, fig. 4.

*Station*

28/71-B.

*Description*

A number of stems growing on a gorgonian and reaching 32 mm in height. Stem fascicled and stiff, branching irregularly. Internodes separated by oblique nodes sloping in alternate directions, with one or two annulations at the base of each. Primary hydrophores free from stem, smooth, sometimes containing a pseudodiaphragm. Secondary hydrophores annulated, at least in basal region. Hydrothecal margin strongly flared outward.

Female gonothecae present, compressed, oval in broad view, with terminal aperture surrounded by an internal collar of perisarc, containing 6-10 eggs.

*Measurements* (mm)

Internode length .. .. .	0,53-0,72
Hydrotheca, depth to diaphragm .. .. .	0,03-0,06
diameter at margin .. .. .	0,17-0,20
Gonotheca, length .. .. .	0,71-1,12
maximum diameter .. .. .	0,35-0,52

*Remarks*

The author has bowed to the opinion of Naumov & Stepaniants (1962) and Vervoort (1972b) in including *H. antarcticum* in the synonymy of *H. delicatulum*, although she feels that there is a distinct Antarctic form in which the female gonotheca is smaller and more slender and without the 'ears' of typical *H. delicatulum* as illustrated by Millard (1975). The gonothecae in the present material are similar to those illustrated by Totton (1930) and Vervoort (1972b).

*H. delicatulum* is well known from the Antarctic, particularly in the area south of America, and was reported from Marion Island by Allman (1888, as *H. flexile*).

*Halecium dufresneae* sp. nov.

Figure 2A-D

*Material*

Holotype: from Station 26/63-A. Part in Muséum National d'Histoire Naturelle, Paris, and part in the South African Museum (SAM-H2785).

*Description of holotype*

One colony, with a thick rootstock flattened below and a thick fascicled stem 245 mm in height. Stem branching and rebranching irregularly but mainly in one plane. Final branches unfascicled, divided into internodes by oblique nodes sloping in alternate directions, each internode bearing a hydrotheca from an apophysis at distal end.

Primary hydrophore not clearly demarcated from apophysis, with a stout pseudodiaphragm in base, adnate to internode almost to diaphragm. Secondary hydrophores rather rare in this material, smooth and not constricted after origin, asymmetrical with adcauline wall longer than abcauline, with or without a pseudodiaphragm. Hydrotheca shallow, with adcauline surface free from stem, with margin usually everted.

Gonothecae borne on sides of hydrophores, the two series together forming a single row on the anterior surface of the stem. Gonotheca flattened, in broad view widening to the truncated distal end, with one or two large embryos discharged into a marsupium which may be as large as, or larger than, itself.

*Measurements (mm)*

Internode, length	..	..	..	..	..	..	0,51-1,00
Hydrotheca, depth from diaphragm	..	..	..	..	..	..	0,03-0,07
diameter at margin	..	..	..	..	..	..	0,19-0,23
Gonotheca, depth	..	..	..	..	..	..	0,94-1,14
maximum diameter	..	..	..	..	..	..	0,38-0,64
Marsupium, depth	..	..	..	..	..	..	0,66-1,14

*Remarks*

Female gonothecae with external marsupia are known from two other species of *Halecium*, namely *H. pallens* Jäderholm, 1904, from South Georgia, and *H. marsupiale* Bergh, 1887, from the Arctic.

The author feels that in these two, as in the present species, the marsupium is an important diagnostic character, and she cannot agree with Naumov & Stepaniants (1962) and Vervoort (1972b) who include *H. pallens* in the synonymy of *H. delicatulum*. A marsupium has never been seen in the latter; moreover



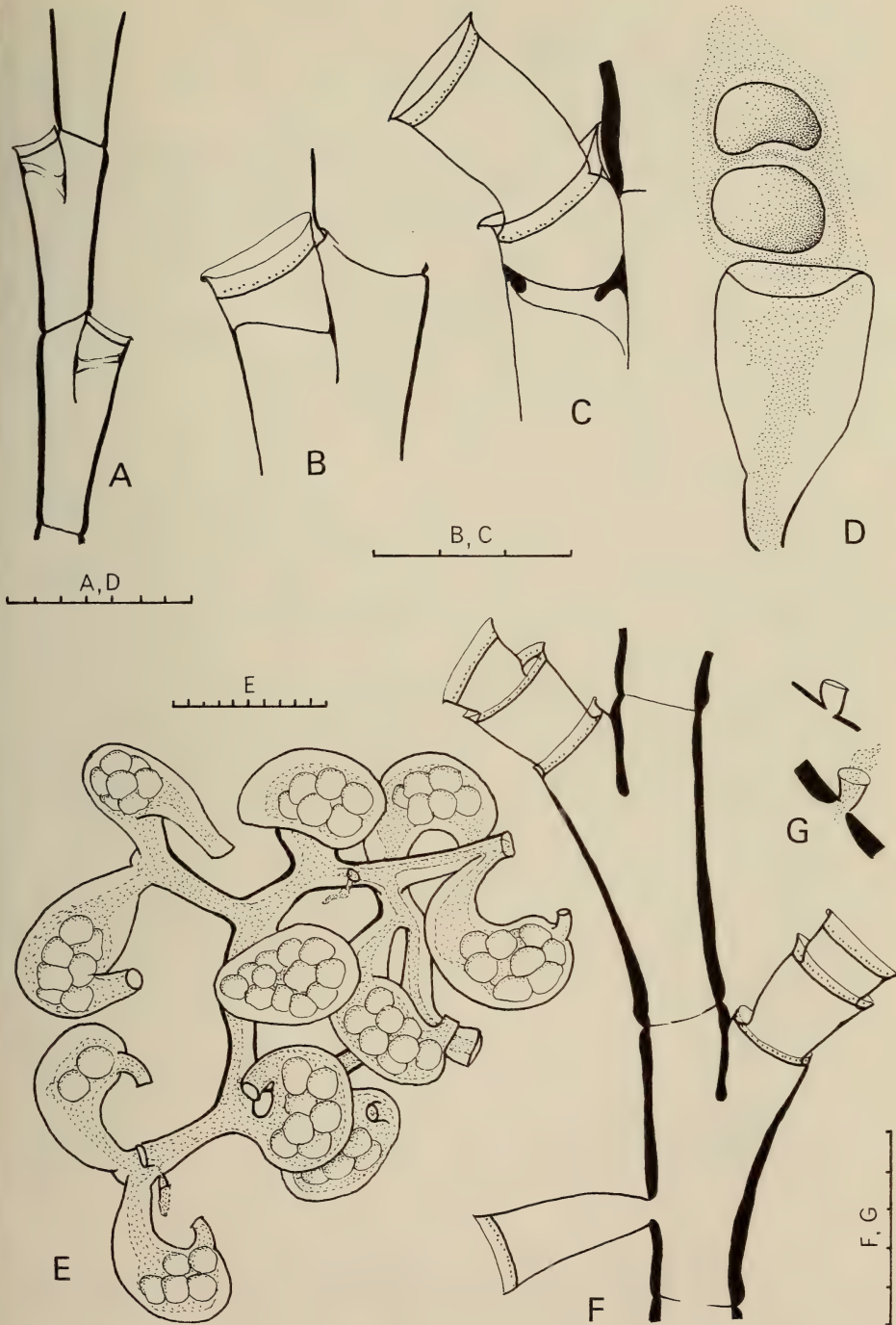


Fig. 2.

*Halecium dufresneae* sp. nov. from the holotype. A-C. Parts of stem with hydrophores: C with secondary hydrophore. D. Gonophore with two embryos in marsupium.

*Hydrodendron arborea* (Allman). E. part of glomulus with female gonophores. F. Part of stem with hydrophores and a giant nematotheca on bottom left. G. normal nematotheca.

Scale in mm/10.

the shape of the mature female gonotheca is different, being wider in broad view and 'eared' in *H. delicatulum*.

It follows that it is not possible to identify most of the species of *Halecium* from sterile material alone.

The present species differs from *H. pallens* in the shorter pedicel of the primary hydrophore and in the marsupium, which is almost as large as, or larger than, the gonotheca and contains only one or two eggs.

### *Halecium jaederholmi* Vervoort, 1972

#### Figure 3A-B

*Halecium jaederholmi* Vervoort, 1972a: 21, fig. 2 (synonymy).

#### Stations

28/71-A; 31/74-A.

#### Description

The first colony (28/71-A) is medium-brown in colour, with thick fascicled stems 4 mm in diameter at the base and 160 mm in maximum height, branching irregularly and in all planes. The second colony (31/74-A) is dark brown and has an even thicker main stem (8 mm diameter at base) and is more stiff and rigid in habit. It reaches a height of 140 mm.

In both colonies the unfascicled parts together with their internodes and hydrophores have a structure exactly like that illustrated by Vervoort (1972a) except that no pseudodiaphragmata are present nor any secondary hydrophores. The hydrothecae are very shallow and adnate to the internodes.

Typical female gonothecae are present in the first colony and contain up to six larvae; some of the gonothecae are damaged and broken off transversely just beyond the aperture. In the second colony all the gonothecae (female) are damaged in this way.

#### Measurements (mm)

Internode, length	..	..	..	..	..	..	0,50-0,94
Hydrotheca, depth to diaphragm		..	..	..	..	..	0,03-0,04
diameter at margin		..	..	..	..	..	0,17-0,23
Gonotheca, length	..	..	..	..	..	..	1,49-1,85
maximum diameter	..	..	..	..	..	..	0,59-0,71

#### Remarks

The distribution of this species has been summarized by Vervoort; it occurs in the Antarctic and Subantarctic, but this is the first record from the Kerguelen area.



*Measurements (mm)*

Normal nematotheca, depth	..	..	..	..	..	0,06-0,10
Giant nematotheca, depth	..	..	..	..	..	0,44-0,48
Gonotheca, maximum length	..	..	..	..	..	0,78-1,02
maximum diameter	..	..	..	..	..	0,47-0,60

*Remarks*

This species is widely distributed in the Antarctic; its type locality is Kerguelen.

As other authors have remarked, the nematothecae are variable in occurrence and not invariably present on each internode. The giant nematothecae have not been recorded before. The regenerated (secondary) hydrophores are very distinctive and clearly distinguish the species from forms such as *H. beanii*.

Family **Lafocidae***Filellum serratum* (Clarke, 1879)

*Filellum serratum*: Vervoort, 1972a: 51, fig. 14a-b. Millard, 1975: 178, fig. 59A-C.

*Stations*

3/11-F; 26/63-J: infertile colonies epizootic on polyzoa and other hydroids.

*Remarks*

This cosmopolitan species has not yet been reported from the Kerguelen area, though it is known from New Zealand and South America.

*Grammaria abietina* (Sars, 1850)

## Figure 3D-E

*Grammaria abietina*: Cornelius, 1975: 382, fig. 3 (synonymy).

*Stations*

26/64-K; 31/74-L.

*Description*

Two colonies with thick, fascicled stems reaching a maximum height of 83 mm and branching in an alternate, subopposite or opposite manner in one plane. Hydrothecae forming six longitudinal rows on stem and branches, but not strictly regular in arrangement.

Hydrotheca curved outwards to a varying degree, with margin everted and either parallel or oblique to axis of stem; free part 0,34-0,51 mm in length; 0,28-0,35 mm in diameter at margin.

A single coppinia present, about 15 mm long and 5 mm wide. Gonothecae tightly adpressed, flask-shaped, with terminal aperture on a short tubular neck. Accessory tubes about three times length of gonothecae, very strongly curved.

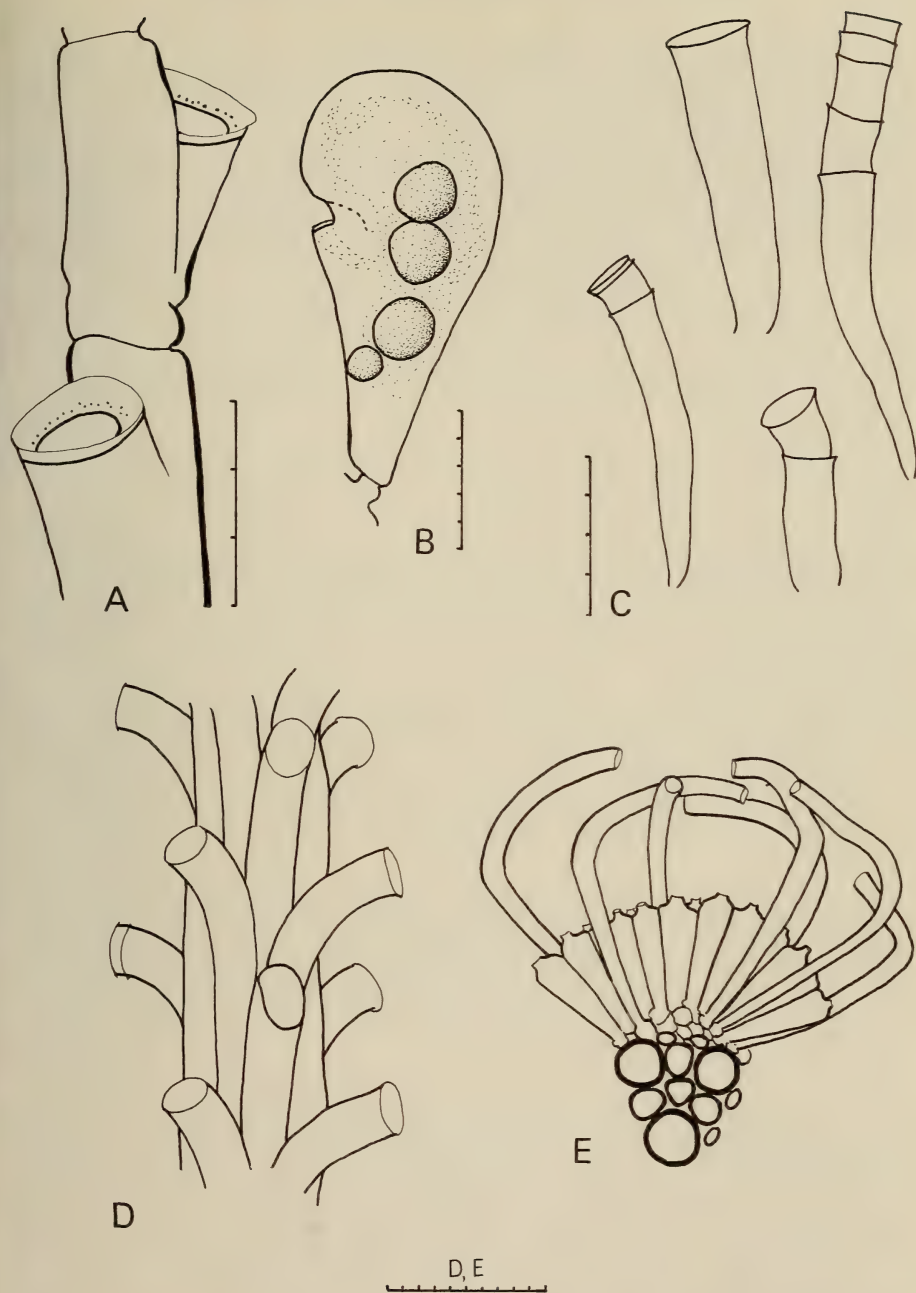


Fig. 3.

*Halecium jaederholmi* Vervoort. A. Part of stem with two hydrophores. B. Gonophore.

*Halisiphonia ?nana* Stechow. C. Hydrothecae.

*Grammaria abietina* (Sars). D. Part of stem with six rows of hydrothecae. E. Part of t.s. of coppinia, showing gonothecae, protective structures, and arrangement of thecal bases in three's in centre of stem.

Scale in mm/10.

*Remarks*

The synonymy of this species was recently revised by Cornelius (1975), who has included as synonyms *G. stentor* Allman, 1888, *G. magellanica* Allman, 1888, and *G. insignis* Allman, 1888.

The species has a bipolar distribution and is widely known from the Arctic and Subarctic as well as from the Antarctic and Subantarctic. The type locality of *G. stentor* is Kerguelen Island.

*Halisiphonia ?nana* Stechow, 1921

## Figure 3C

*Halisiphonia nana*: Stechow, 1925: 452, fig. 22.

*Station*

26/64-S.

*Description*

An infertile colony epizootic on *Sertularella picta*. Pedicel arising from hydrorhiza and merging smoothly into hydrotheca which widens evenly to margin. No diaphragm or annular thecal thickening. Margin sometimes slightly everted.

*Measurements* (mm)

Pedicel + hydrotheca, height	..	..	..	..	..	0,64-0,95
Pedicel, diameter at base	..	..	..	..	..	0,04-0,12
Hydrotheca, diameter at margin	..	..	..	..	..	0,14-0,23

*Remarks*

This material is assigned with some doubt to *H. nana*. The dimensions are more or less in agreement with those of Stechow, and are too small for *H. megalotheca* Allman, but the pedicel is often rather wide at the base and the thecal margin may be everted. *H. nana* has been reported only once, from east of Bouvet Island; the gonothecae are unknown.

*Hebella striata* Allman, 1888

*Hebella striata* Allman, 1888: 30, pl. 15 (figs 3, 3a). Vanhöffen, 1910: 313. Vervoort, 1972a: 62, fig. 17b-c.

*Station*

26/64-R.

*Description*

An infertile colony epizootic on *Grammaria abietina*. Details exactly as in Vervoort's material, but dimensions a little larger.

*Measurements (mm)*

Pedicel, length	..	..	..	..	..	..	..	0,44-0,87
Hydrotheca, depth	..	..	..	..	..	..	..	0,77-1,10
diameter	..	..	..	..	..	..	..	0,24-0,31

*Remarks*

This species is known mainly from the Subantarctic near South America, but was reported from Kerguelen by Vanhöffen (1910).

*Lafoea dumosa* (Fleming, 1820)

*Lafoea fruticosa*: Millard, 1975: 187, fig. 61A-F.

*Lafoea dumosa*: Cornelius, 1975: 385, fig. 4 (synonymy).

*Stations*

3/10-B; 3/11-B. Both colonies infertile.

*Description*

Stems flexuous, reaching a maximum height of 78 mm, with many fragments.

*Remarks*

The author has followed Cornelius (1975) in uniting *L. fruticosa* (M. Sars, 1851), *L. gracillima* (Alder, 1856) and *L. dumosa* under the last name.

*Zygothylax crozetensis* sp. nov.

## Figure 4

*Material*

Holotype: from station 26/64-B. Part in Muséum National d'Histoire Naturelle, Paris, and part in the South African Museum (SAM-H2779).

Other stations: 2/6-A (infertile); 21/56-C (infertile); 22/58-B (male); 26/23-D (fertile); 31/74-F (fertile).

*Description of holotype*

A large, branching colony 220 mm in height. Rootstock a large mass of interwoven fibres flattened below and reaching 45 mm in diameter. Stem fascicled and thick, giving off thick primary branches in an irregular fashion and mainly in one plane, these branches giving off secondary and tertiary branches which are strictly in one plane. Final branches (hydrocladia) subopposite in arrangement, lightly fascicled or unfascicled. Hydrocladia and final terminations of other branches segmented where exposed, with one or two hydrothecae to an internode, but with many irregular regenerative nodes. Hydrothecae normally alternate in arrangement with the two rows more or less in one plane, and this arrangement characteristic of unfascicled hydrocladia

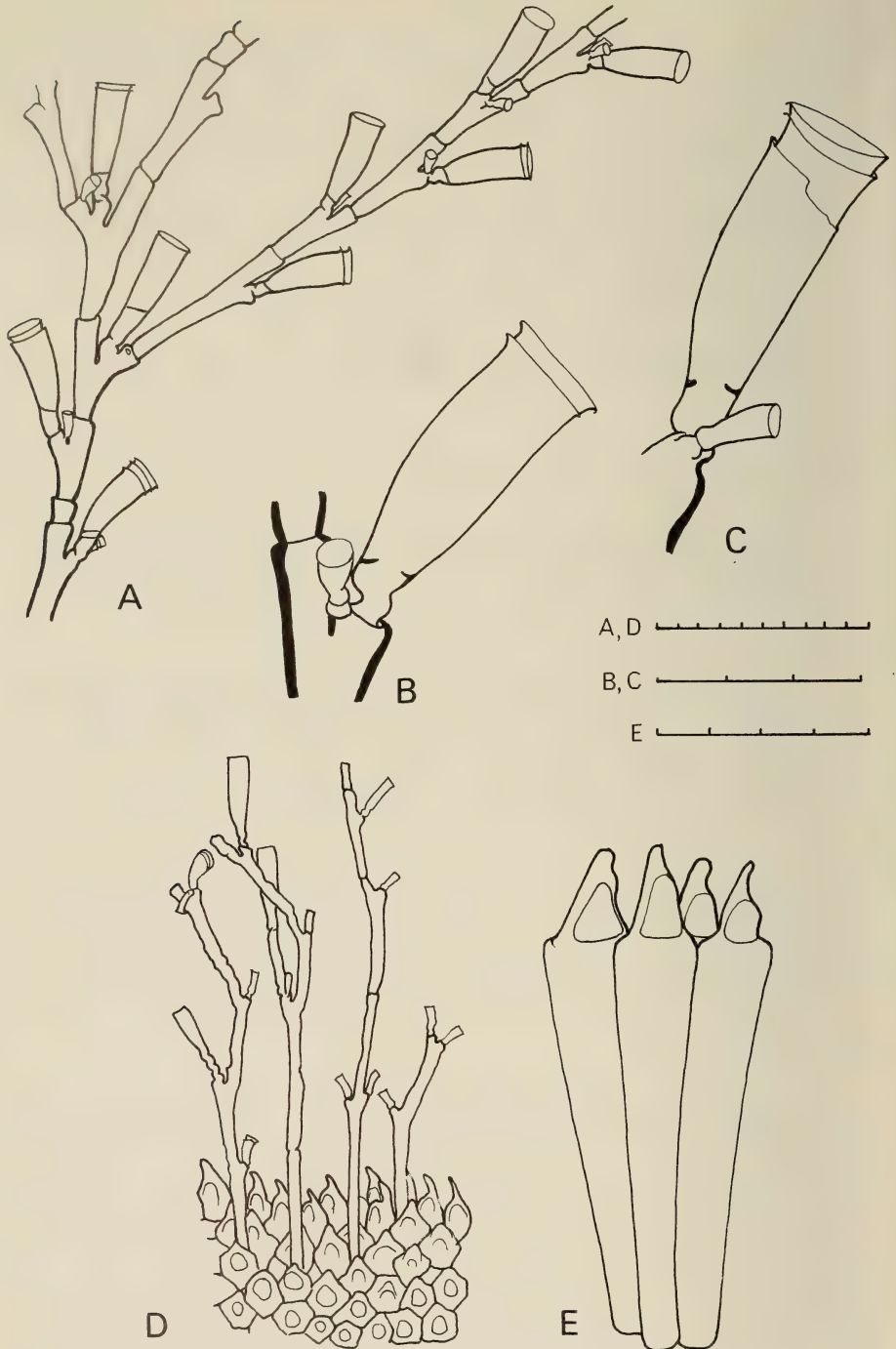


Fig. 4.

*Zygophylax crozetensis* sp. nov. from the holotype. A. Part of stem showing origins of hydrocladia. B-C. Hydrothecae and nematothecae. D. Surface view of coppinia showing hoods of gonothecae and protective structures. E. Gonothecae from t.s.

Scale in mm/10.



and smaller branches, but in fascicled branches supplementary hydrothecae may arise from peripheral tubes in any plane and in any position imparting a very irregular appearance to the whole.

Hydrothecae tubular, widening to margin which is slightly everted, curved outwards, those in axils of hydrocladia less curved and practically straight. Diaphragm distinct and oblique.

Nematothecae two-chambered, with a short basal chamber and a long tubular distal chamber, one or two on each hydrotheca-bearing apophysis, that/those of the axillary hydrotheca shifted on to the apophysis next to it, various irregular supplementary ones present on peripheral tubes of stem and branches.

Coppiniae numerous and clothing most of the larger branches completely to a width of 3–5 mm, so that it is not possible to distinguish one from another. Coppinia consisting of adpressed gonothecae with between them irregular branching structures bearing nematothecae and rarely hydrothecae as well. Gonotheca slender, widening distally to top of adnate part, then narrowing to a free, pointed, and sometimes curved, hood or horn bearing an aperture on one side. Sex not determinable.

#### Measurements of holotype (mm)

Hydrothecal pedicel, height	..	..	..	..	..	0,06–0,13
Hydrotheca, height abcauline	..	..	..	..	..	0,32–0,38
diameter at margin	..	..	..	..	..	0,16–0,20
Pedicel + hydrotheca, height	..	..	..	..	..	0,40–0,47
Nematotheca, height	..	..	..	..	..	0,09–0,19
diameter at margin	..	..	..	..	..	0,05–0,08

#### Remarks

In the four fertile samples all the gonothecae are of the same shape. Most, however, are empty. Contents are present in 22/58–B only, and these are male.

The hydrothecae of this species are similar to those of *Z. africana* Stechow, 1923, and a number of related species, and particularly to '*Lafoea halecioides* Allman, 1874 (= '*Lafoea pinnata* Sars, 1873). The last-mentioned, however, has an open coppinia with unfused gonothecae.

Nutting (1905) described and figured a closed coppinia with one-horned gonothecae for a species which he called *Lictorella halecioides*. This is apparently a synonym for *Zygophylax antipathes* (Lamarck, 1816), and not for *Z. pinnata*. It is probably this account which prompted Totton (1930: 166) to mention 'hooded apertures' for *Z. antipathes* and not the account of Trebilcock (1928) who does not mention the species. However, *Z. antipathes* has somewhat broader hydrothecae than the present material, and the gonothecae as depicted by Nutting have terminal apertures.

It appears that a number of southern hemisphere species of *Zygophylax* have similar trophosomes but different gonosomes. The gonothecae of the

present species are almost exactly like those of *Cryptolaria pectinata* (Allman, 1888).

Family **Campanulariidae**

*Campanularia norvegiae* Broch, 1948

Figure 5A-E

*Campanularia norvegiae* Broch, 1948: 16, fig. 5.

*Station*

8/24-E.

*Description*

A dense fertile colony growing on an empty tube. Hydrorhiza reticular. Pedicel sometimes spirally grooved throughout, but very variable and often smooth in certain areas, always with a segment of lesser diameter at distal end. Hydrotheca funnel-shaped, oval in section and thickened, more so at the narrow ends; thickened at, or just below, margin.

Gonotheca irregularly bottle-shaped, with a short annulated pedicel, narrowing distally to terminal aperture, often twisted or irregularly corrugated, circular in section, empty or containing planulae.

*Measurements* (mm)

Pedicel + hydrotheca, length	..	..	..	..	..	1,70-8,50
Hydrotheca, depth	..	..	..	..	..	0,48-0,72
maximum diameter (broad view)	..	..	..	..	..	0,38-0,56
Gonothecal pedicel, depth	..	..	..	..	..	0,24-0,32
Gonotheca, depth	..	..	..	..	..	1,58-2,28
maximum diameter	..	..	..	..	..	0,52-0,65

*Remarks*

This species is distinguished from the closely related *C. integra* MacGillivray, 1842, by the shape of the gonotheca. Since the gonothecae contain planulae it is obvious that no medusoid is released.

*C. norvegiae* was originally described from South Georgia.

*Campanularia* sp.

Figure 5F

*Stations*

26/63-G; 26/64-R.

*Description*

Infertile colonies epizootic on other hydroids. Pedicels of variable length, with one terminal spherule of lesser diameter, generally roughly corrugated

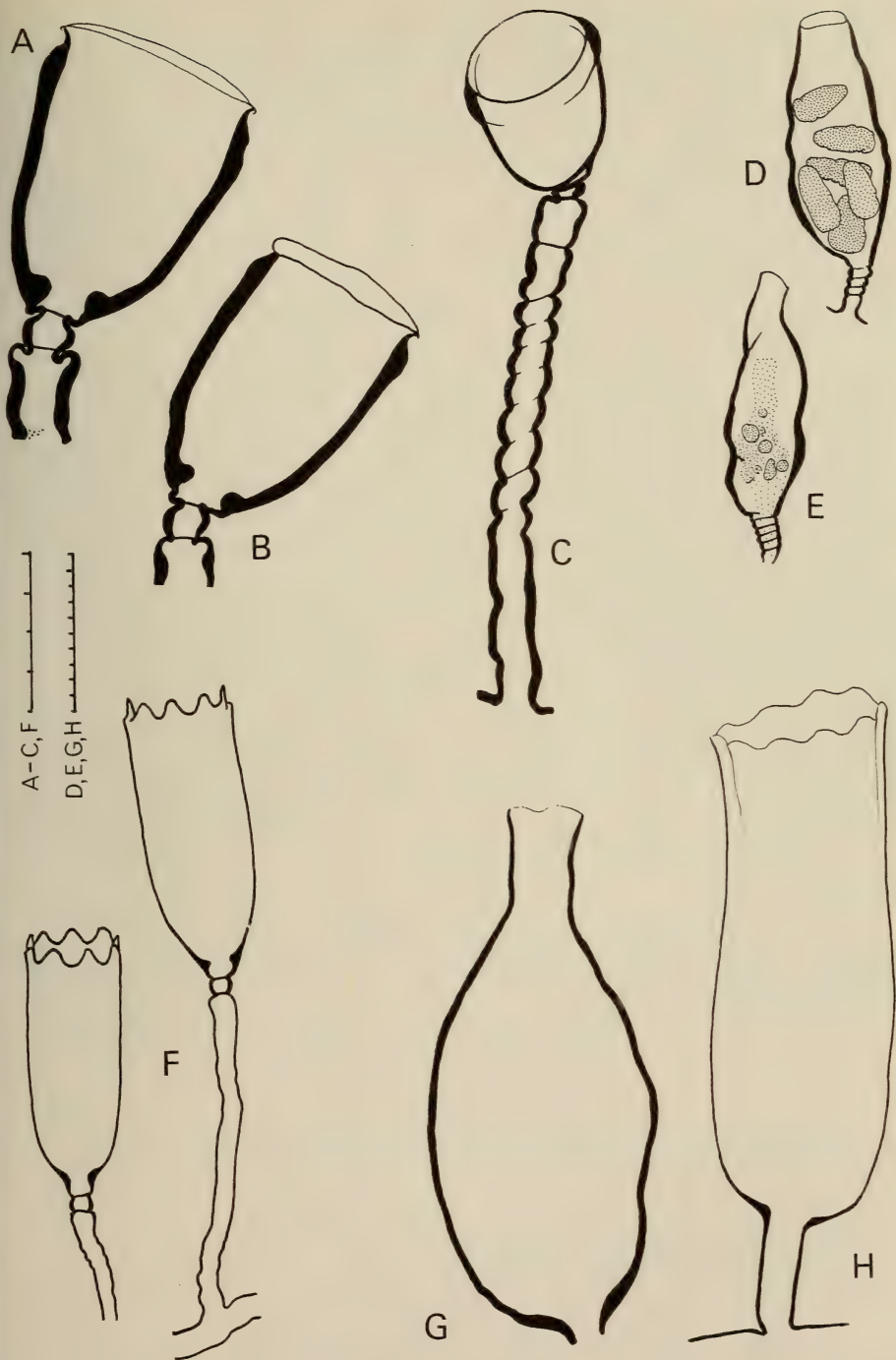


Fig. 5.

*Campanularia norvegiae* Broch. A-C. Hydrothecae. D-E. Gonophores.

*Campanularia* sp. F. Hydrothecae.

*Tulpa diverticulata* Totton. G. Gonotheca. H. Hydrotheca.

Scale in mm/10.

immediately below this and at base. Hydrotheca deep, with parallel sides, with an annular thickening near base, with 8–10 slender, bluntly rounded marginal teeth.

*Measurements (mm)*

Pedicel, length	..	..	..	..	..	..	0,48–1,07
Hydrotheca, depth	..	..	..	..	..	..	0,60–0,90
diameter at margin	..	..	..	..	..	..	0,25–0,33
diameter/depth	..	..	..	..	..	..	0,34–0,51

*Remarks*

In the absence of gonophores this species cannot be definitely diagnosed. The two most commonly reported species of *Campanularia* from the Antarctic are *C. hicksoni* Totton, 1930, and *C. tincta* Hincks, 1861. (*C. cylindrica* Allman, 1876, from Kerguelen is probably a synonym of the former.) These two species are distinguished mainly by their gonothecae—smooth in the former, annulated in the latter; however, none of the Antarctic material attributed to *C. tincta* has yet been found with gonothecae and possibly only one species is involved.

*Silicularia rosea* Meyen, 1834

*Silicularia rosea*: Ralph, 1956: 293. Millard, 1968: 259. Millard, 1971: 405.

*Silicularia bilabiata*: Ralph, 1956: 285, figs 2–3. Ralph, 1957: 842.

*Station*

31/74–C.

*Description*

A rich, fertile colony on brown alga.

*Remarks*

*S. rosea* is known from Crozet and Kerguelen Islands and many other localities in the Antarctic and Subantarctic. The distribution was summarized by Ralph (1957).

*Tulpa diverticulata* Totton, 1930

Figure 5G–H

*Tulpa diverticulata* Totton, 1930: 145, fig. 5. Ralph, 1957: 844, fig. 7l–n.

*Campanularia diverticulata*: Naumov & Stepaniants, 1962: 72.

*Stations*

24/61–C; 26/64–H; 30/73–A; 31/74–B.

*Description*

Hydrorhiza creeping on other hydroids, polyzoa and worm tubes, but often becoming free to form a tangled mass. Hydrothecal pedicels of very

variable length, unsegmented, though often with regeneration nodes. Hydrothecae as in previous descriptions; regenerated margins sometimes present. Gonothecae arising from hydrorhiza on very short pedicels, irregularly oval, with terminal aperture on long narrow neck.

*Measurements* (mm)

Hydrothecal pedicel, length	..	..	..	..	..	0,60–2,80
Hydrotheca, length	..	..	..	..	..	3,00–4,10
diameter at margin	..	..	..	..	..	0,95–1,35
Gonotheca, length including pedicel	..	..	..	..	..	1,85–3,45
maximum diameter	..	..	..	..	..	0,89–1,50

*Remarks*

Some of these colonies are very rich, and several stolons may run together or twine round each other simulating a fascicled stem. However, the pedicels always arise at right angles, and there is never any question of an erect branching stem with oblique pedicels as in *T. tulipifera* (Allman, 1888). It is clear that these are two separate species.

Very fine cross-striations may be present on some of the hydrothecae and gonothecae in certain colonies.

Young gonothecae are cone-shaped and similar to those described by Fraser (1944) for *T. speciosa* (Clarke).

*T. diverticulata* is so far known only from New Zealand and to the south of it. It is a new record for Kerguelen and Crozet Islands. The closely related *T. tulipifera* occurs in Heard Island (Allman 1888) and in the south-western Atlantic (Vervoort 1972a).

Family **Syntheciidae**

*Staurotheca antarctica* Hartlaub, 1904

*Staurotheca antarctica* Hartlaub, 1904: 16, pl. 1 (fig. 4), pl. 2 (fig. 4). Totton, 1930: 176, 178, fig. 28, pl. 2 (fig. 6). Vervoort, 1972a: 198, figs 67, 68b.

*Stations*

26/64–M (fertile); 30/73–B (fertile); 31/74–D.

*Description*

Luxurious colonies with unfascicled stems which branch dichotomously and reunite to form an elaborate reticulum in one plane. Nodes irregular. Hydrothecae generally arranged in decussate pairs, but rarely in groups of three, and with many irregularities.

Male and female gonothecae present, as in previous descriptions.

*Measurements* (mm, all without regenerations)

Hydrotheca, depth abcauline .. .. .	0,34-0,44
depth adcauline, adnate part .. .. .	0,38-0,50
depth adcauline, free part .. .. .	0,10-0,20
adnate part/total adcauline depth .. .. .	0,66-0,83
diameter at mouth .. .. .	0,17-0,20
Gonotheca, male, length .. .. .	0,84-1,12
maximum diameter .. .. .	0,55-0,66
Gonotheca, female, length .. .. .	1,30-1,48
maximum diameter (including spur) .. .. .	0,98-1,21

*Remarks*

There is little to add to the description of this well-known Antarctic and Subantarctic species. Vervoort (1972a) has summarized the distribution.

*Staurotheca dichotoma* Allman, 1888

*Staurotheca dichotoma* Allman, 1888: 76, pl. 36 (fig. 1). Billard, 1910: 27, figs 11-12. Billard, 1914: 15, fig. 9. Totton, 1930: 175, 178, fig. 27.

*Stations*

7/22-B; 8/24-A (fertile: female gonophores); 8/25-B (fertile: male and female gonophores); 11/31-A; 14/45-A; 21/57-B (fertile: female gonophores); 22/58-G; 23/59-A (fertile: male gonophores); 24/61-B; 26/63-C; 26/64-L; 30/73-C (fertile: female gonophores); 31/74-E (fertile: female gonophores).

*Description*

Luxuriant colonies. Stems thick, fascicled at base in larger colonies, branching in a subdichotomous manner, reaching a maximum height of 130 mm. Hydrothecae generally 3 to a whorl (and forming 6 longitudinal rows), but some of the thickest stems have 4 to a whorl (and 8 longitudinal rows) and the thinner terminal branches only 2 (4 longitudinal rows). Hydrothecae adnate for almost their entire length. Male and female gonothecae as described by Billard (1910) and Totton (1930).

*Measurements* 8/25-B (mm)

Hydrotheca, depth abcauline .. .. .	0,59-0,67
depth adcauline, adnate part .. .. .	0,78-0,96
depth adcauline, free part .. .. .	0,03-0,08
adnate part/total adcauline depth .. .. .	0,91-0,97
diameter at margin .. .. .	0,27-0,32
Gonotheca, female, length .. .. .	1,49-2,17
maximum diameter .. .. .	1,11-1,29
Gonotheca, male, length .. .. .	1,23-1,60
maximum diameter .. .. .	0,78-1,02

*Remarks*

As previous authors have remarked, *S. dichotoma* is clearly distinguished from *S. antarctica* by the structure of the female gonotheca and by its greater dimensions. The species is widely distributed in the Antarctic and Subantarctic. Its type locality is Marion Island, not far from the present localities.

Family *Sertulariidae**Sertularella geodiae* Totton, 1930

## Figure 6E-F

*Sertularella geodiae* Totton, 1930: 196, fig. 43, pl. 3 (figs 7-8). E. A. Briggs, 1939: 37. Ralph, 1961: 831, fig. 24c, g. Vervoort, 1972a: 120, fig. 37.

*Station*

31/74-K.

*Description*

A number of infertile stems and fragments, reaching a maximum height of 40 mm. Stem stiff, fascicled and straight at base, geniculate in terminal regions only, branching rather sparsely and in one plane. Branches unfascicled, arising below hydrothecae and, when several are present, below every third hydrotheca.

Hydrotheca adnate for about half adcauline wall, bent outwards (a perpendicular dropped through centre of margin passes through adcauline wall), with a few undulations on free part of adcauline wall, with wide mouth. No internal teeth.

*Measurements (mm)*

Internode length .. .. .	1,01-1,52
diameter at node .. .. .	0,20-0,32
Hydrotheca, length abcauline .. .. .	0,66-0,77
length adcauline, adnate part .. .. .	0,49-0,61
length adcauline, free part .. .. .	0,46-0,60
adnate part/total adcauline length .. .. .	0,46-0,55
diameter at margin .. .. .	0,35-0,40

*Remarks*

This material is in many ways intermediate between *S. geodiae* and *S. conica* Allman, 1877, considering especially Vervoort's description of the latter (1972a: 123). However, *S. conica* has an unfascicled stem and a hydrotheca which narrows more markedly to the mouth; its distribution is mainly tropical. The author has therefore assigned this material to *S. geodiae* in spite of the absence of gonothecae; this is a species known from New Zealand, Tasmania

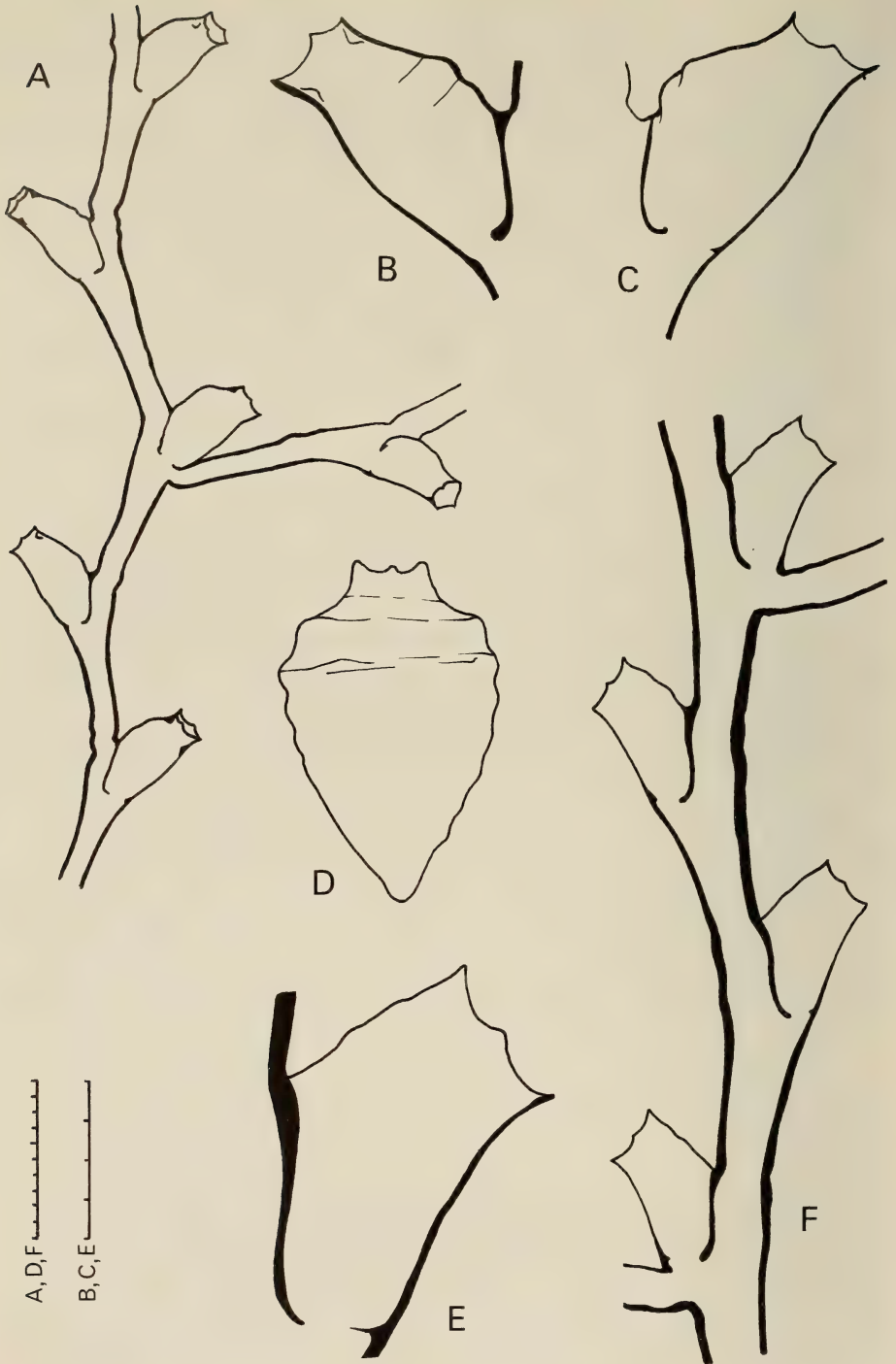


Fig. 6.

*Sertularella picta* (Meyen). A. Part of stem showing origin of a hydrocladium. B-C. Hydrothecae. D. Gonotheca.  
*Sertularella geodiae* Totton. E. Hydrotheca. F. Part of stem showing origins of two hydrocladia.

Scale in mm/10.



and the area around the southern tip of South America, but which has not been reported from Kerguelen.

*Sertularella picta* (Meyen, 1834)

Figure 6A-D

*Sertularella picta*: Hartlaub, 1905: 645, fig. L<sup>A</sup>. Billard, 1922: 106, fig. 2B. Stechow, 1923: 187, fig. B<sup>1</sup>. Millard, 1971: 405, fig. 6A, B. Vervoort, 1972a: 111, figs 34, 35.

*Stations*

8/24-D; 9/26-A; 9/27-A; 22/58-E; 26/64-F; 28/71-D; 31/74-H. The last three fertile.

*Description*

Stems slender and straggling, branching repeatedly in an irregular fashion to produce tangled colonies often intertwined with polyzoans and with *Symplectoscyphus subdichotomus*. Stem normally unfascicled, but rarely with one or two supplementary tubes in basal region, usually with one or two annulations at base and on origin of branches, geniculate, reaching a maximum height of 38 mm, often reuniting by stolons with other stems. On most stems the two rows of hydrothecae are in the same plane, but in other stems, or even in other parts of the same stem, they may be shifted on to the anterior surface so that the two rows subtend an obtuse angle between them. Branches arising below hydrothecae, with one or two annulations at origin and a long first internode, otherwise similar to stem and of same diameter. Internodes slender, very variable in length, separated by oblique nodes sloping in alternate directions, usually with an annulation immediately above each node.

Hydrotheca fusiform, adnate for less than half adcauline height, narrowed below margin. In most hydrothecae the marginal teeth are equally developed and the margin is perpendicular to the axis (a perpendicular dropped through centre of margin passes through basal thickening of adcauline wall), but in some the abcauline marginal tooth is produced so that the margin is tilted towards the stem (and a perpendicular dropped through centre of margin passes through the hydrophore or base of the abcauline wall). All intergradations may occur in one colony. The free part of the adcauline wall usually has two to four indistinct annulations, but the latter are of variable development—they may form distinct striations which pass round the sides of the hydrotheca almost to the abcauline wall, or they may be almost obsolete. Small internal teeth are present in most hydrothecae, but again the degree of development is variable; the full complement appears to be three (one median abcauline and two latero-adcauline), but one or two, or even all three, may be absent. In a few stems there is no trace of internal teeth.

Gonothecae borne on front of stem immediately below hydrothecae, obovate, with three to four distinct annulations in distal half, with three or four blunt marginal spines, with external marsupium. Sex not determinable.

*Measurements* (mm)

Internode, length	..	..	..	..	..	..	0,77-1,34
diameter at node	..	..	..	..	..	..	0,12-0,18
Hydrotheca, length abcauline	..	..	..	..	..	..	0,55-0,70
length adcauline, adnate part	..	..	..	..	..	..	0,24-0,35
length adcauline, free part	..	..	..	..	..	..	0,40-0,51
adnate part/total adcauline length	..	..	..	..	..	..	0,33-0,44
diameter at margin	..	..	..	..	..	..	0,20-0,26
Gonotheca, length	..	..	..	..	..	..	1,50-2,15
maximum diameter	..	..	..	..	..	..	1,30-1,52

*Remarks*

The identification of this species has been based mainly on Vervoort's work (1972a), who also found considerable variability in structure. The form of the colony, the shape of the hydrotheca and the gonotheca are very similar to his material.

The species is known from the Falkland/Tierra del Fuego region, and was also reported from Marion Island (Millard 1971). The Marion Island material differs in the smooth hydrothecal wall and the greater displacement of the two rows of hydrothecae.

*Symplectoscyphus curvatus* (Jäderholm, 1917)

## Figure 7A-C

*Sertularella curvata* Jäderholm, 1917: 9, pl. 1 (figs 11-12).

*Symplectoscyphus curvatus*: Totton, 1930: 192, fig. 40, pl. 2 (figs 1-3). E. A. Briggs, 1939: 31.

*Sertularella curvatus*: Naumov & Stepaniants, 1972: 45, fig. 7.

*Stations*

26/63-E; 26/64-C. Both infertile.

*Description*

Many unrooted, unfascicled stems and fragments yellow-brown in colour and reaching a maximum length of 44 mm. Most stems pinnate, geniculate, giving off alternate branches at each elbow and immediately below every third hydrotheca. On the proximal part of the stem the nodes are not clearly demarcated and the hydrothecae are well spaced and do not overlap, but on the distal part and on the branches the nodes are distinct and the tip on one hydrotheca overlaps the base of the next. The two rows of hydrothecae and branches in one plane.

Hydrotheca tubular, large, adnate for less than half adcauline length, curved outwards, not narrowing to mouth and with diameter in centre region approximately equal to that at margin, marginal teeth well developed, no internal teeth. No gonothecae.

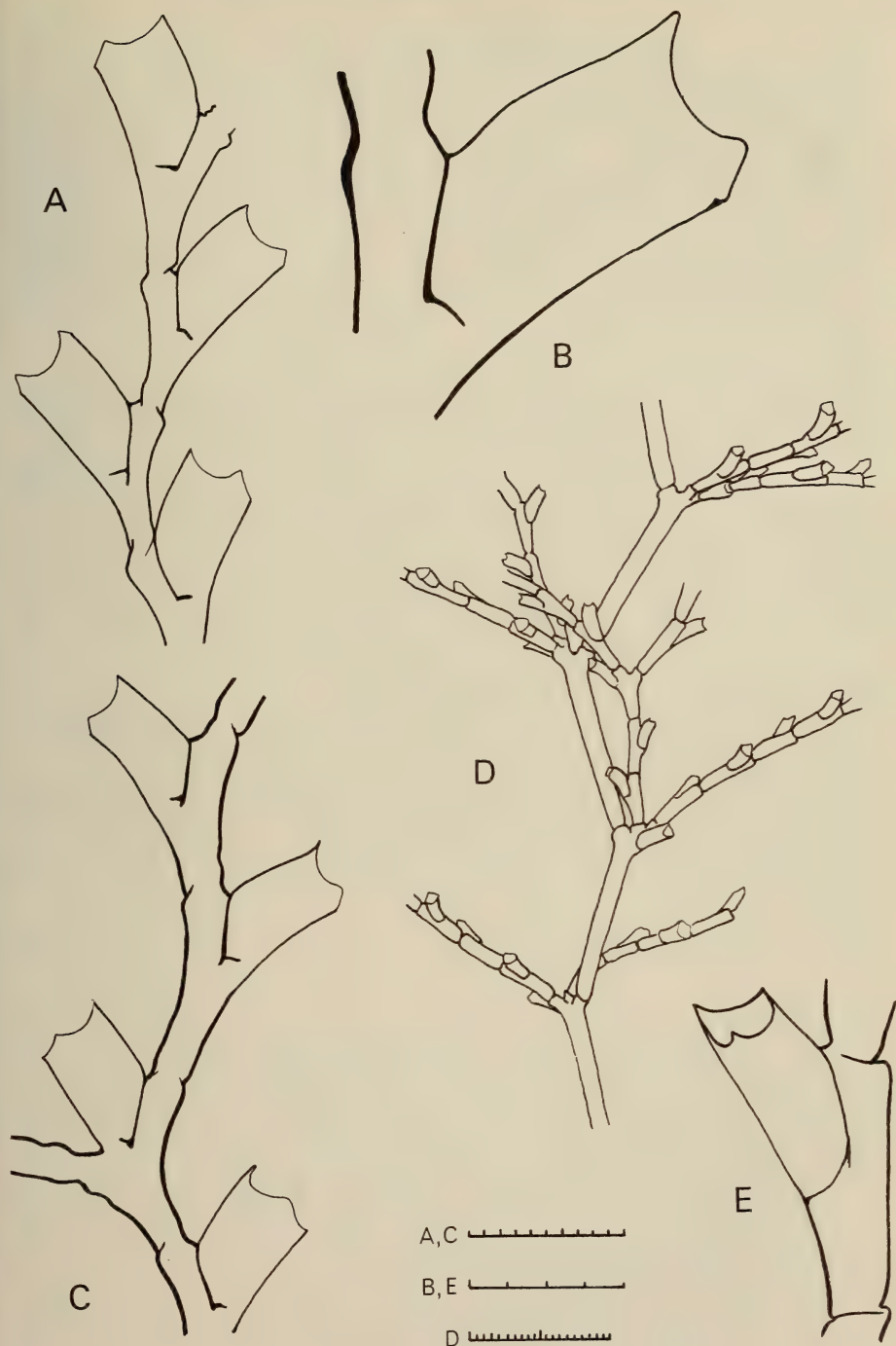


Fig. 7.

*Symplectoscyphus curvatus* (Jäderholm). A. Distal part of hydrocladium. B. Hydrotheca. C. Part of stem showing origin of hydrocladium.

*Symplectoscyphus elongatus* (Jäderholm). D. Part of stem showing origins of hydrocladia. E. Hydrotheca.

Scale in mm/10.

	26/64-C	<i>Symplectoscyphus exsertus</i> (Allman)
<i>Measurements</i> (mm)		
Internode length .. .. .	0,80-1,32	0,43-0,60
Hydrotheca, length abcauline .. .. .	0,62-0,70	0,28-0,32
length adcauline, adnate part .. .. .	0,36-0,44	0,14-0,17
length adcauline, free part .. .. .	0,59-0,68	0,22-0,28
adnate part/total adcauline length .. .. .	0,35-0,41	0,35-0,44
diameter at mouth .. .. .	0,41-0,49	0,12-0,14

### Remarks

The measurements of the hydrothecae agree with those of Jäderholm and Totton; they are a little greater than those of Briggs and Naumov & Stepaniants.

*S. curvatus* shows resemblances to *S. exserta* (Allman, 1888) from Heard Island. However, the author has examined type material of the latter species and finds that it is much smaller in all its dimensions. The measurements are included above for comparison.

### *Symplectoscyphus elongatus* (Jäderholm, 1904)

#### Figure 7D-E

*Sertularia articulata* Allman, 1888: 61, pl. 29 (figs 3, 3a).

*Sertularella articulata*: Jäderholm, 1905: 29, pl. 11 (fig. 4), pl. 12 (figs 1-3). Naumov & Stepaniants, 1972: 42, fig. 5A.

?*Sertularella spiralis* Hickson & Gravely, 1907: 19, pl. 3 (figs 19-20).

*Sertularella elongata*: Naumov & Stepaniants, 1962: 80, fig. 5. Naumov & Stepaniants, 1972: 42, fig. 5B.

*Symplectoscyphus articulatus*: Rees & Thursfield, 1965: 127.

*Symplectoscyphus elongatus*: Vervoort, 1972a: 136, figs 43, 44a (synonymy).

### Stations

8/25-C; 26/64-D; 8/24-C.

### Description

Three samples, the first with several infertile stems reaching 67 mm, the second with numerous infertile stems and fragments reaching a maximum height of 52 mm, and the third with numerous stems and fragments reaching a maximum height of 58 mm. None of the stems rooted. Stems golden brown in colour, unfascicled, geniculate. Internodes of stem very long, up to 3,3 mm, each bearing a prominent apophysis on distal end on which is seated one hydrotheca and on each side of it a hydrocladium, the apophyses with their paired hydrocladia arranged in a loose spiral. Nodes very distinct.

Hydrocladia bearing alternate hydrothecae, and commonly alternate sub-branches arising opposite every third hydrotheca, the two rows of hydrothecae and branches usually in one plane but occasionally very slightly displaced

towards one surface. Internodes of variable length, those of hydrocladium bearing one or two hydrothecae, those of its sub-branches one.

Hydrothecae tubular, adnate for about half adcauline wall, abcauline wall straight or curved slightly outwards, with three prominent marginal teeth, but no internal teeth.

A few empty and damaged gonothecae present in 8/24-C, of the same shape and size as described by Hickson & Gravely (1907).

#### Measurements (mm)

Hydrotheca, length abcauline .. .. .	0,39-0,52
length adcauline, adnate part .. .. .	0,21-0,35
length adcauline, free part .. .. .	0,18-0,36
adnate part/total adcauline length .. .. .	0,37-0,65
diameter at mouth .. .. .	0,17-0,23

#### Remarks

This species has been reported many times from Antarctic and Subantarctic waters; Kerguelen Island is the type locality. The synonymy of the species is fully discussed by Vervoort (1972a). This synonymy is accepted here, though with some reservations about the inclusion of *Sertularella spiralis* Hickson & Gravely, 1907, a form with internal hydrothecal teeth.

### *Symplectoscyphus mawsoni* Briggs, 1939

#### Figures 8-9

*Non Sertularella biformis* Jäderholm, 1905: 28, pl. 11 (figs 1-3).

*Sertularella biformis*: Totton, 1930: 199, fig. 45, pl. 2 (fig. 8). Naumov & Stepaniants, 1972: 47, fig. 9.

*Symplectoscyphus mawsoni* E. A. Briggs, 1939: 35, fig. 2, pl. 16 (figs 1-2). Naumov & Stepaniants, 1972: 46, fig. 8.

#### Stations

10/30-A; 8/24-B.

#### Description

The first colony (10/30-A) consists of two stems 56 mm in maximum length, and a number of fragments. Basal part of stem lightly fascicled for 16-30 mm, the rest unfascicled and straight. Stem divided into internodes by distinct oblique nodes sloping in alternate directions. Each internode with a distal apophysis, alternately on the left and right, which bears a hydrotheca and two hydrocladia, one on each side of the hydrotheca, the two rows of hydrothecae in one plane. Many of the hydrocladia and hydrothecae of the lower half of the stem missing or damaged, those in the upper half better preserved. Each pair of hydrocladia forming an angle of about 40° with the stem and about 90° with each other. Hydrocladium divided into regular inter-

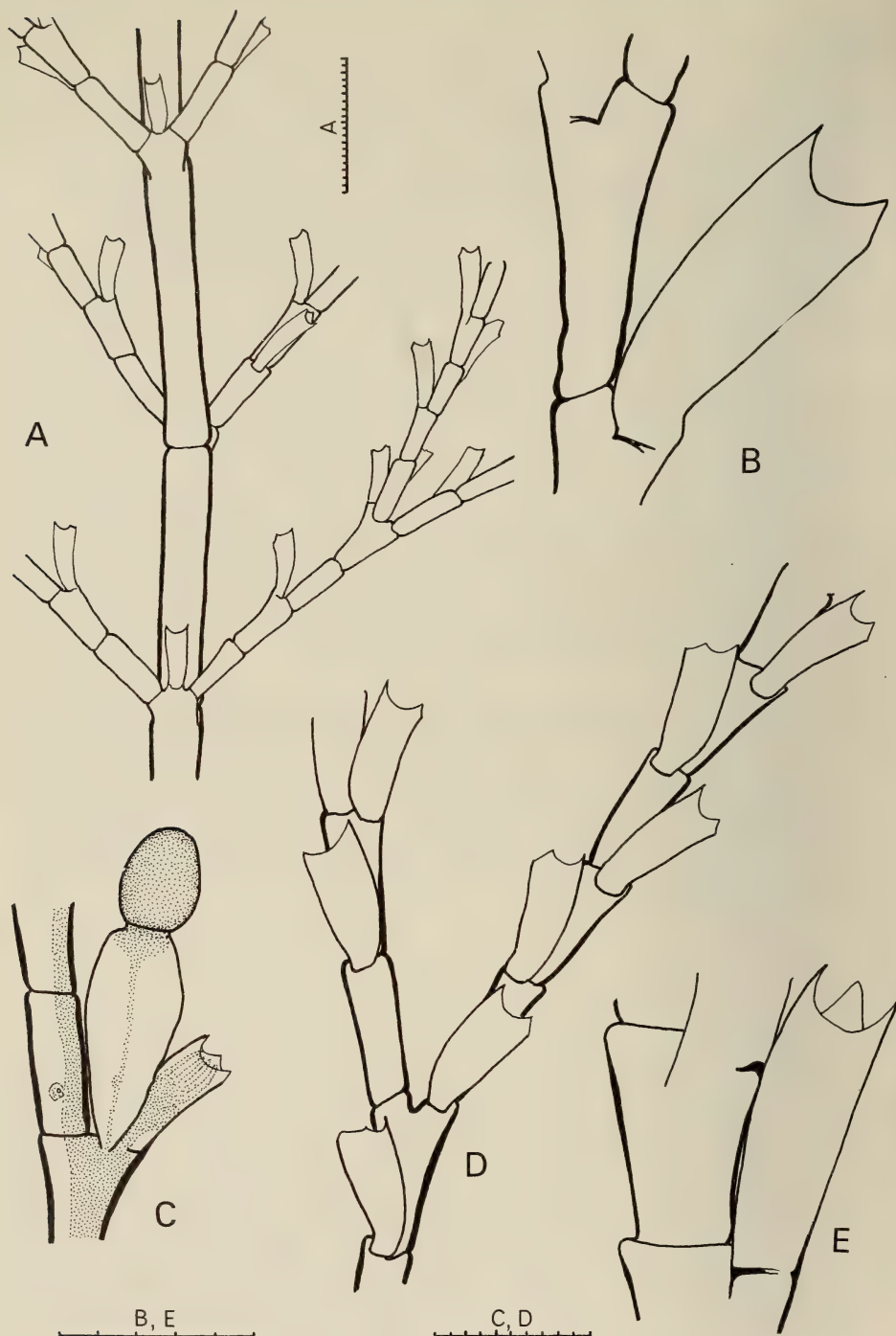


Fig. 8.

*Symplectoscyphus mawsoni* Briggs. A. Thick part of stem in side view showing origins of hydrocladia. B. Hydrotheca. C. Gonotheca with external marsupium. D. Part of hydrocladium showing bifurcation. E. A hydrotheca from Totton's material (BM 1929.10.28.158) attributed by him to *Sertularella biformis*, here included in *S. mawsoni*.

Scale in mm/10.

nodes by straight nodes, each bearing a hydrotheca near the distal end; dividing dichotomously at the distal end of the fourth internode, one limb of the dichotomy being slightly thicker than the other; both limbs sometimes dividing dichotomously once or twice more. The two rows of hydrothecae on the hydrocladium not in one plane but forming an acute angle between them. Hydrotheca completely free from internode, very delicate and often crumpled in basal part, curved outwards, widening towards aperture, with three well-developed marginal teeth, one adcauline and two latero-abcauline. No internal teeth. Operculum of three valves. Floor similar to that of *Sertularella* (Fig. 8A, B, D; Fig. 9 left).

The second colony (8/24-B) is in a very fragmentary condition, consisting mainly of small pieces of hydrocladia. There is, however, a stem of 110 mm with a few stumps of hydrocladia left; it is fascicled for the first 45 mm. Another portion of stem 46 mm long bears regular pairs of hydrocladia as in 10/30-A. The hydrocladia branch up to five times. This colony is fertile and bears

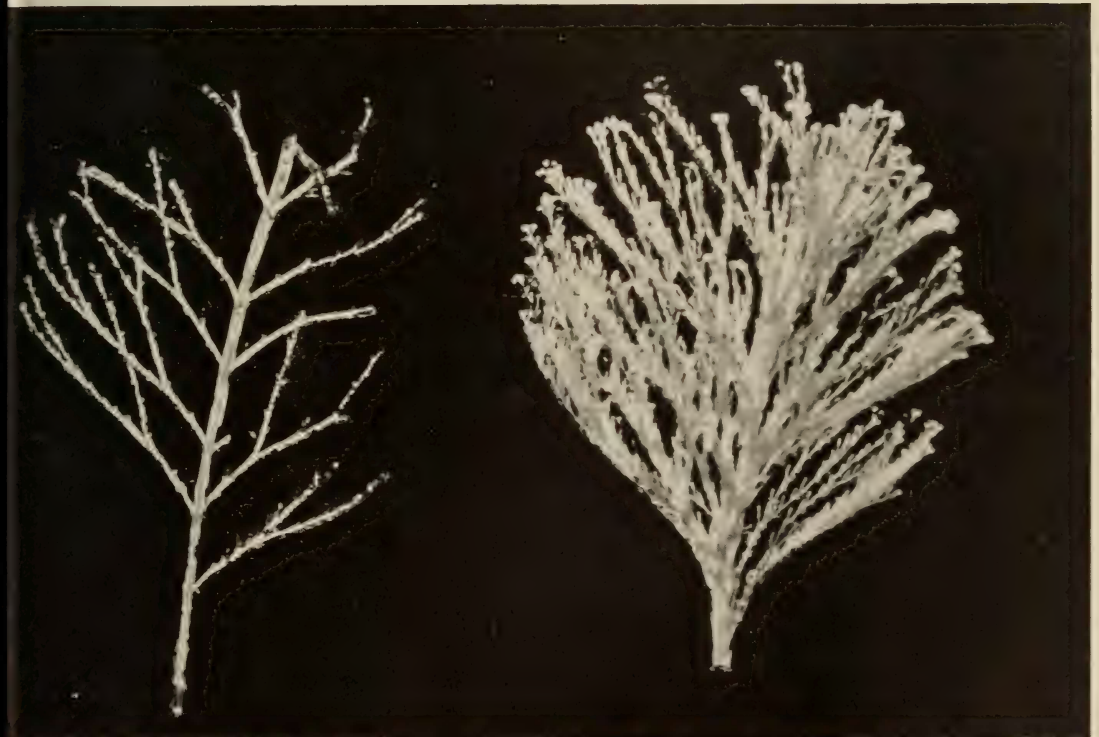


Fig. 9.

*Symplectoscyphus mawsoni* Briggs. A stem from the *Marion-Dufresne* collection (Station 10/30-A) on the left, compared with Totton's specimen attributed to *Sertularella biformis* on the right ( $\times 2,5$ ). Photo: D. Gerneke.

numerous gonothecae on the hydrocladial internodes. Female gonotheca elongated oboval, with external marsupium, containing one planula (Fig. 8C).

Measurements (mm)	10/30-A	8/24-B
Stem, internode length .. .. .	2,20-3,95	2,50-4,10
diameter .. .. .	0,52-0,70	0,50-0,62
Hydrocladium, internode length .. ..	0,57-1,09	0,67-1,15
Hydrotheca, depth abcauline .. .. .	0,71-0,82	0,74-0,83
depth adcauline .. .. .	0,87-1,00	0,92-1,01
diameter at margin .. .. .	0,24-0,32	0,29-0,32

### Remarks

Several species have been recorded from the Antarctic and Subantarctic which resemble one another in their method of branching, aptly described by Naumov & Stepaniants (1972) as 'panicle-shaped'. These can be divided into two groups:

1. Those where the hydrothecae are adnate for half or more of their height and where the 'panicle' is flexuous: included under the synonymy of *Symplectoscyphus elongatus* by Vervoort (1972a) and in this paper.

2. Those where the hydrothecae have little or no adnate part and where the 'panicle' is stiff.

It is the second group that concerns us here and it includes material recorded under the names of *Symplectoscyphus* (or *Sertularella*) *biformis* and *mawsoni*. Previous and present records of these species, together with the more important measurements, are listed in Table 1 (the depth of the hydrotheca is not included because of doubt as to exactly how it was measured by different authors).

The type material of *Sertularella biformis* Jäderholm, 1905, was examined (Fig. 10E-F), and Jäderholm's description is confirmed. The material differs from all other records in Table 1 in the absence of hydrocladia or any vestiges thereof, in the absence of nodes in most of the stem, in the grouping of the distal hydrothecae in three's, and in the shape of the hydrotheca which narrows towards the margin. Totton (1930) assigned material to this species (*S. biformis*) assuming that the specimens 'would correspond with the apical part missing from Jäderholm's type . . .', and that the stem progresses in complexity from base to apex, both assumptions being unwarranted. Totton's material, on examination, was found to differ from Jäderholm's in all the characters listed near the beginning of this paragraph (Fig. 8E, Fig. 9 right). It is clearly a different species altogether. Jäderholm's species has not been rediscovered to date, and the type material remains the sole specimen.

The remaining records in Table 1 seem to be conspecific and to form a series in the order shown, starting with the type material of *Symplectoscyphus mawsoni* Briggs and ending with Totton's material. In this series the complexity of branching in the hydrocladia increases, and the diameter of the hydrotheca



A comparison of the Antarctic records of species of *Symplectoscyphus* of the *mauwsoni* group. (Measurements to the nearest tenth of a mm.)

Species	Locality	No. of branches to hydrocladia	Stem inter-node length (mm)	Stem diameter (mm)	Hydro-cladium inter-node length (mm)	Marginal diameter of hydrotheca (mm)
<i>Symplectoscyphus mauwsoni</i> Briggs, 1939	King George Land	0	—2,0	0,8	—	0,5
<i>Sertularia mauwsoni</i> : Naum. & Step., 1972	Antarctic south of Australia	1	2,0-2,1	0,7-1,0	0,4-0,5	0,2-0,3
<i>Marton-Dufresne</i> material . . . . .	Kerguelen Shelf	1-5	2,2-4,1	0,5-0,7	0,6-1,2	0,2-0,3
<i>Sertularia biformis</i> ? Naum. & Step., 1972	Antarctic south of Australia	'rebranching repeatedly'	3,7-4,0	1,0	0,9-1,5	0,2-0,3
<i>Sertularia biformis</i> : Totton, 1930	Cape Adare	3-4	1,1-2,5*	0,9-1,0*	0,5-0,8*	0,2-0,3*
<i>Sertularia biformis</i> Jäderholm, 1905	Graham Land	No hydrocladia	No nodes	0,1-0,4*	—	0,2*

\* Supplemented by author's own measurements.



*Remarks*

The hydrothecae in this material are of a similar size to those described by Ritchie (1913); they are a little longer than those described by most other authorities.

*S. plectilis* is known from a number of localities in the Antarctic and Subantarctic, the nearest to the present locality being Bouvet Island (Broch 1948). The distribution and synonymy are summarized by Vervoort (1972b).

*Symplectoscyphus subarticulatus* (Coughtrey, 1875)

## Figure 10A-D

*Thuiaria sub-articulata* Coughtrey, 1875: 287, pl. 20 (figs 32-34).

*Symplectoscyphus subarticulatus*: Ralph, 1961: 801, 811, figs 14g-h, 15a-c (synonymy).

Blanco, 1968: 213, pl. 4 (figs 1-3). Leloup, 1974: 41, fig. 38.

*Stations*

2/6-B (fertile); 2/7-A; 14/45-C.

*Description*

Fascicled, pinnate stems reaching a maximum height of 105 mm and a maximum diameter at the base of 1,5 mm. Hydrothecae completely obscured by the peripheral tubes in the proximal part of the stem, with only the margins visible in the central region, uncovered in the distal unfascicled region. In the distal region nodes fairly clearly marked and sloping in alternate directions, each internode bearing three hydrothecae and a hydrocladium arising immediately below the third hydrotheca. The two rows of hydrothecae and hydrocladia in one plane.

Hydrocladium separated from stem apophysis by a distinct node, narrower than stem. Nodes scarce, oblique, not well marked, sometimes not visible for the entire length. Hydrothecae closely set, more so in the distal region where the margin of one overlaps the base of the next, most hydrothecae with a fenestra immediately below the base on one side.

Hydrotheca tubular, curved outwards, adnate for about two-thirds adcauline height.

Gonothecae borne on hydrocladia below hydrothecae, long and carrot-shaped, widest at distal end, strongly annulated with 15-17 circular crests (not spiral), with terminal aperture on a raised collar.

*Measurements* (mm)

Hydrotheca, length abcauline .. .. .	0,40-0,47
length adcauline, adnate part .. .. .	0,38-0,60
length adcauline, free part .. .. .	0,23-0,31
adnate part/total adcauline length .. .. .	0,57-0,70
diameter at margin .. .. .	0,31-0,33
Gonotheca, length .. .. .	2,35-3,10
maximum diameter .. .. .	0,86-1,24

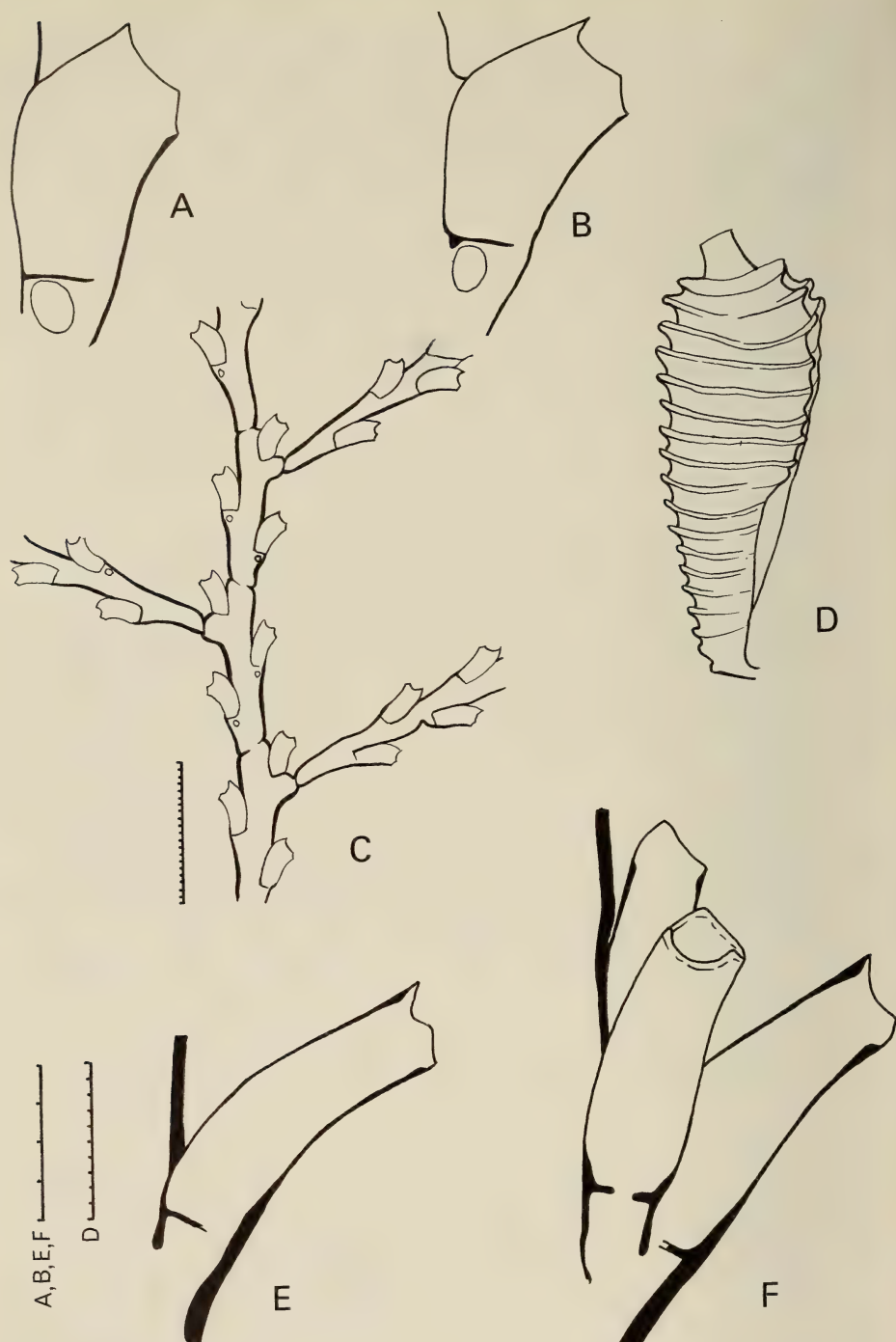


Fig. 10.

*Symplectoscyphus subarticulatus* (Coughtrey). A-B. Hydrothecae. C. Distal part of stem showing origins of hydrocladia. D. Gonotheca.  
*Symplectoscyphus biformis* (Jäderholm). E. A single hydrotheca. F. A group of three hydrothecae. Drawn from the holotype.

Scale in mm/10.

### Remarks

The hydrothecae of this material are larger than those of Ralph but smaller than those of Blanco. The details of structure and the method of branching agree exactly with those described by Ralph. The only hesitation in the identification lies in the gonotheca, which is about twice the length of that described by Ralph and has more annulations (15–17 as against 5–8). However, the shape of the gonotheca is exactly like that depicted by Coughtrey (he does not give the size, but the diagram shows 10 annulations).

*S. subarticulatus* is best known from New Zealand, but recent reports show that it also occurs in the southern Argentine (Blanco) and in Chile (Leloup). It is a new record from the Kerguelen area.

### *Symplectoscyphus subdichotomus* (Kirchenpauer, 1884)

#### Figure 11D–F

*Sertularella subdichotoma* Kirchenpauer, 1884: 46, pl. 16 (fig. 1).

*Symplectoscyphus subdichotomus*: Blanco, 1969: 49, figs 1–18. Vervoort, 1972a: 140, figs 44b–d, 45 (synonymy). Leloup, 1974: 42, fig. 40.

### Stations

Small form: 8/25–E; 26/64–E (fertile); 26/65–A (fertile); 28/71–C (fertile); 30/73–D; 31/74–G.

Large form: 3/11–D; 14/44–B; 21/57–D; 22/58–J; 26/63–F.

### Description

Colonies flexuous and straggling, growing profusely with polyzoans and *Sertularella picta*, and often intertwined to form a bushy mat. Stem unfascicled, reaching 33 mm in height (small form) or 58 mm (large form), generally geniculate and giving off a branch at each elbow immediately below every third hydrotheca, but many irregularities present. The two rows of hydrothecae and branches in one plane. Branches of same diameter as stem, forming an angle of 85–108° with it, and often rebranching producing a subdichotomous effect. Most of the nodes not clearly defined and recognizable only by an indentation of the perisarc, but those at the origin of each branch, and on the stem immediately above each axillary hydrotheca, more clearly defined and usually forming a definite septum. Internodes always longer than the hydrothecae, which do not overlap each other.

Hydrotheca adnate for over half adcauline height, curved outwards, widest in centre and narrowing to margin, with three well-developed marginal teeth and no internal teeth.

Gonotheca obovate (female), with 10–11 strong and crested circular annulations (not spiral) and a long flaring mouth-funnel, containing two or three large planulae.

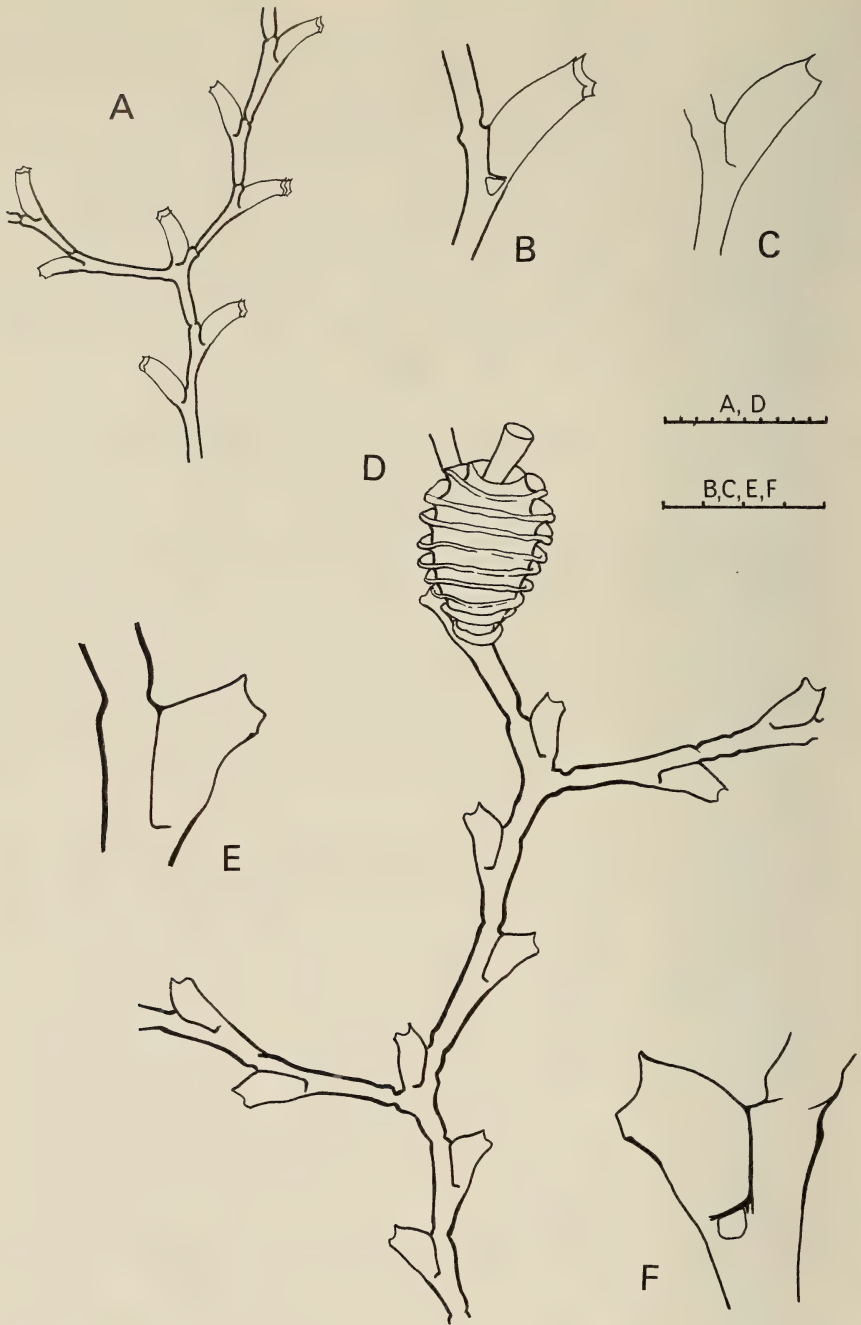


Fig. 11.

*Symplectoscyphus plectilis* (Hickson & Gravely). A. Part of stem showing origin of hydrocladium. B-C. Hydrothecae.

*Symplectoscyphus subdichotomus* (Kirchenpauer). D. Stem of small form showing origins of hydrocladia and a gonotheca. E. Hydrotheca of small form. F. Hydrotheca of large form.

Scale in mm/10.

*Measurements* (mm)

	<i>Small form</i>	<i>Large form</i>
Internode length .. .. .	0,47-0,74	0,74-1,27
Hydrotheca, length abcauline .. .. .	0,26-0,31	0,28-0,38
length adcauline, adnate part .. .. .	0,25-0,30	0,25-0,39
length adcauline, free part .. .. .	0,13-0,21	0,14-0,28
adnate part/total adcauline length .. .. .	0,58-0,68	0,48-0,71
diameter at mouth .. .. .	0,13-0,17	0,20-0,30
Gonotheca, length .. .. .	1,06-1,55	
maximum diameter .. .. .	0,58-0,84	

*Remarks*

As far as the detailed measurements are concerned this material includes two size-ranges—a small and a large—the smaller fitting best with the dimensions given by Vervoort, Blanco and earlier workers. The growth-form and structure of the two are the same, but there are no gonothecae to confirm the identification of the larger form.

The synonymy of *S. subdichotomus* has been reviewed by Vervoort (1972a), who also gave some excellent diagrams. There is no doubt at all that the present material (at any rate the smaller form) belongs to the same species. Because of the presence of a number of closely allied species of dubious validity, the geographical range is uncertain—the species is certainly common in the Falklands/South American region, but has apparently not been reported from Kerguelen.

Family *Plumulariidae**Kirchenpaueria triangulata* (Totton, 1930)

*Plumularia triangulata* Totton, 1930: 225, fig. 61.

*Kirchenpaueria triangulata*: Millard, 1975: 375, fig. 119E-H.

*Station*

17/50-B.

*Description*

A rich, fertile colony epizootic on *Plumularia insignis*. Stems reaching 18 mm in height, unfascicled, with nodes absent or very indistinct, otherwise details as in previous descriptions. Gonophores female, reaching 2 mm in length, triangular in section and containing a single layer of eggs over a central spadix.

*Remarks and distribution*

This is a new record for the Kerguelen area. The species was previously known from South Africa (in depths greater than 100 m) and from New Zealand.

*Oswaldella bifurca* (Hartlaub, 1904)

## Figure 12A-C

*Schizotricha bifurca* Hartlaub, 1904: 16, pl. 3 (figs 4-8).

*Oswaldella bifurca*: Totton, 1930: 208, fig. 50. Naumov & Stepaniants, 1962: 98.

*Station*

26/64-J.

*Description*

Several infertile stems reaching a maximum height of 22 mm. Stem divided by transverse nodes into internodes which usually bear one hydrocladium each, but rarely two. Cauline nematothecae very difficult to distinguish and sometimes missing; at the maximum development there is one mamelon on the hydrocladial apophysis and one nematotheca in the axil, with another nematotheca (or a naked sarcophore) on the main stem above the axil.

Hydrocladia unbranched near the proximal and distal ends of colony, branched in the central region. Branches arising from below hydrothecae and to one side, as many as four from one hydrocladium, and these may be all on the same side, on alternate sides or in opposite pairs. One secondary hydrocladium has a tertiary branch.

The two rows of primary hydrocladia not in the same plane but displaced towards anterior surface of stem. Secondary hydrocladia similarly displaced, so that the whole arrangement is in at least six different planes and presents a stiff and spiky appearance. Since the hydrothecae are borne on the anterior surface of the hydrocladia, those of primary and secondary hydrocladia do not face one another.

Hydrocladia generally heteromerous with alternating athecate and thecate internodes, but many variations; the athecate internodes may be absent or duplicated, long or short, and may or may not bear a median nematotheca. Thecate internodes usually with one median inferior and one median superior nematotheca, but the nematotheca is often missing leaving only a naked sarcophore, and this is especially common in the first thecate internode of the hydrocladium. Nematothecae, when present, curved and scoop-shaped. Median superior nematotheca situated behind distal part of adcauline thecal wall which is not completely adnate.

Hydrotheca wider than deep, with more or less straight abcauline wall and margin at least slightly oblique.

*Measurements* (mm)

Thecate internode, length	..	..	..	..	..	0,42-0,96
Hydrotheca, depth abcauline	..	..	..	..	..	0,12-0,19
diameter at margin	..	..	..	..	..	0,17-0,22



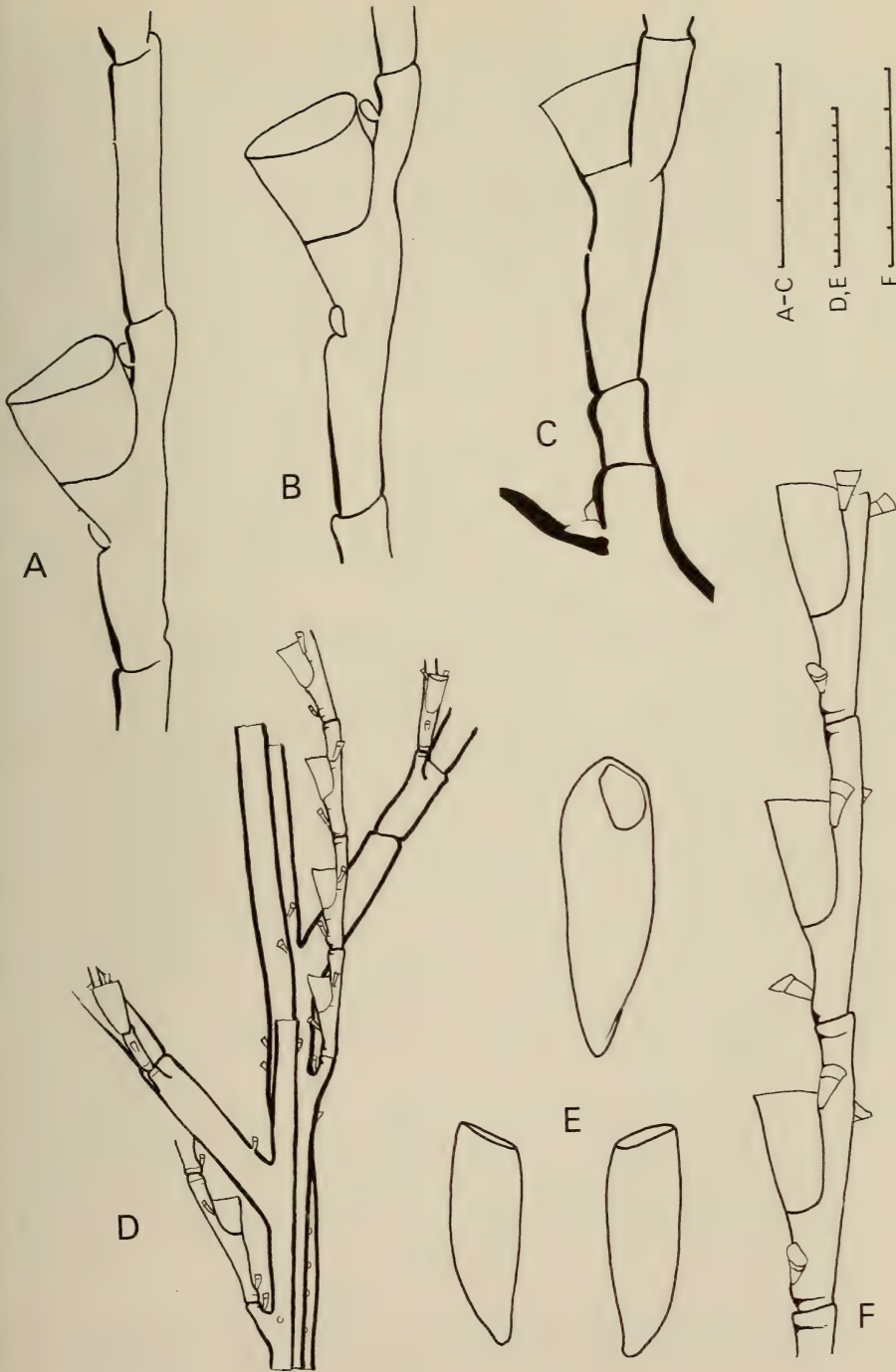


Fig. 12.

*Oswaldella bifurca* (Hartlaub). A-B. Normal parts of hydrocladia. C. Proximal end of hydrocladium showing origin from stem and first thecate internode which is without a nematotheca.

*Plumularia insignis* Allman. D. Part of stem in thinner region showing origins of two branches and their preceding hydrocladia. E. Gonothecae. F. Part of hydrocladium.

Scale in mm/10.

*Remarks*

This material is assigned to *O. bifurca* with some hesitation, the decision being based mainly on the shape of the hydrotheca, which is wider than deep, and on the method of branching. As regards the latter feature Totton's words (1930) are pertinent, when he says for *O. bifurca* 'Hydrothecae of hydroclade and branch not strictly opposed, but facing slightly upwards'. On the other hand the features used by Totton as diagnostic for *O. bifurca*, namely 'once-branched hydrocladia' and the absence of an inferior nematotheca on the first hydrocladial internode, are found to be variable and of dubious value. The presence of athecate internodes in the hydrocladium and the number of hydrocladia to a stem internode are also variable characters. This species is known from various localities in the Antarctic; it has not been reported before from Kerguelen.

*Plumularia insignis* Allman, 1883

## Figure 12D-F

*Plumularia flabellum*\* Allman, 1883: 19, pl. 1 (figs 1-4).

*Plumularia insignis* Allman, 1883: 21, pl. 2. Billard, 1910: 32, fig. 14.

*Plumularia abietina* Allman, 1883: 21, pl. 3.

*Plumularia insignis* v. *flabellum*: Billard, 1910: 34, fig. 15.

*Plumularia insignis* v. *abietina*: Billard, 1910: 35.

*Plumularia* sp. Naumov & Stepaniants, 1962: 99, fig. 19.

*Stations*

3/10-A; 3/11-C; 7/22-A; 17/50-A; 18/52-A; 23/59-D; 24/61-A; 26/64-A; 30/73-E.

*Description*

Many magnificent colonies, the tallest reaching 940 mm. Rootstock a mass of interwoven fibres suitable for anchoring in mud. Stem long, flexuous or fairly stiff, fascicled for the greater part, giving off branches in all planes, unsegmented. Immediately below each branch a single hydrocladium arises from the stem and from the same component tube, otherwise cauline hydrocladia occur only rarely. Component tubes of stem bearing longitudinal rows of nematothecae.

Branches fascicled or unfascicled, pinnate, divided by transverse nodes at irregular intervals into internodes bearing one to four alternate hydrocladia. Hydrocladial apophysis with two axillary nematothecae (one anterior and one posterior) with a mamelon between them, and one (or rarely two) nematothecae on distal end. Nematothecae on main axis rather irregular, but at least one between every two successive hydrocladia and several below the first hydrocladium.

\* Although *P. flabellum* has page priority over *P. insignis*, from Article 24(a) of the Code of Zoological Nomenclature, Billard (1908: 759) counts as the 'first reviser' and he has clearly chosen *P. insignis* as the name of the composite species.

In some colonies the hydrocladia bear practically only thecate internodes, each with one hydrotheca and three nematothecae (one median inferior and one pair of laterals), athecate internodes occurring only sporadically and obviously resulting from regeneration after injury. In other colonies intermediate athecate internodes are present throughout, each with one median nematotheca and two internodal septa. Thecate internodes very rarely have two median inferior nematothecae. Internodal septa usually not so well developed as in the type material: 1-2 below hydrotheca, 0-3 behind it, and 0-1 above it.

Gonothecae arising from branches next to hydrocladia, elongated, widening distally, with a terminal oblique opening, as illustrated by Allman (1883) for *P. abietina*.

#### Measurements (mm)

Thecate internode, length	..	..	..	..	..	0,54-0,80
Hydrotheca, height abcauline	..	..	..	..	..	0,21-0,34
diameter at margin	..	..	..	..	..	0,14-0,21
Gonotheca, length	..	..	..	..	..	1,40-1,95
maximum diameter	..	..	..	..	..	0,35-0,58

#### Remarks

This species occurs in several varieties, of which three (described by Allman as *P. insignis*, *P. flabellum* and *P. abietina*) are known from the Subantarctic. In the general appearance of the colony and in the detailed measurements, most of the present material closely resembles the nominal variety illustrated by Allman (1883: pl. 2). One colony, however (26/64-A), is of stouter build and more irregular branching and is more like Allman's diagram of *P. flabellum* (1883: pl. 1). Of the three, Allman showed hydrocladia on the main stem only in *P. flabellum*, Nowhere has the singular character of one hydrocladium below each branch been described, and if this character is indeed peculiar to the Kerguelen material it would be worth naming a separate variety.

Most of this material is unusual in possessing as the 'normal' condition only thecate internodes in the hydrocladia, athecate internodes being rare and sporadic. One colony alone (26/64-A, mentioned also above) has regular intermediate athecate internodes. Billard (1910) has commented on the irregularity of occurrence of athecate internodes which are often the result of regeneration after injury. Naumov & Stepaniants (1962) described some infertile material from Kerguelen and Heard Islands without athecate internodes as *Plumularia* sp. This is without doubt the same species.

The species is known from Prince Edward Island, Marion Island, Kerguelen and Heard Islands, and there are two varieties from the East Indies.

#### *Schizotricha unifurcata* Allman, 1883

*Schizotricha unifurcata* Allman, 1883: 28, pl. 7 (figs 1-3). Stechow, 1925: 498. Totton, 1930: 231, fig. 65, pl. 3 (fig. 4). Naumov & Stepaniants, 1972: 54. Blanco & De Miralles, 1972: 21, pl. 5 (figs 34-40).

*Polyplumularia unifurcata*: Billard, 1910: 41, fig. 18.

*Stations*

8/25-A; 9/26-B (fragments); 10/30-B; 22/58-A; 23/59-C.

*Description*

Stems with tangled rootstock for mud-penetration and reaching 175 mm in height. Hydrocladia branching one to three times, 10-18 mm in length. Details of hydrocladia as in type material.

Male gonothecae present on first colony, arising from thecate internodes below hydrothecae, pear-shaped, with oblique distal aperture, bearing two to four nematothecae on basal region.

*Remarks*

Stechow (1925) combined the species *S. unifurcata* Allman, 1883; *S. turqueti* Billard, 1906; *S. anderssoni* Jäderholm, 1904; and *S. glacialis* (Hickson & Gravely, 1907) under one name. Totton (1930) added *S. multifurcata* Allman, 1883. All of these species are Antarctic or Subantarctic in distribution.

This material is very similar to the type material and indeed, two of the colonies come from the type locality (Kerguelen Island).

## DISCUSSION

Of the 33 species here recorded (omitting *Campanularia* sp.) 5 are cosmopolitan, namely *Modeeria rotunda*, *Halecium delicatulum*, *Halecium tenellum*, *Filellum serratum* and *Lafaea dumosa* (Table 2).

The remaining 28 species show only a very slight affinity with the nearest continental masses, for only 1 (3,6%) also occurs in South Africa (*Kirchenpaueria triangulata*) and only 8 (28,6%) also occur in the Australasian region.

The affinities of these 28 species are in fact mainly with the South American region (or Magellan Province, including the Falklands and South Georgia) and with the Antarctic Continent, for 19 of the species (67,9%) also occur in the former and 14 (50,0%) in the latter.

Surprisingly, there is little obvious affinity with Bouvet Island (3 species: 10,7%) or Marion and Prince Edward Islands (5 species: 17,9%) which lie at much the same latitude, but this is probably merely a reflection of the inadequate knowledge of these islands.

This analysis thus supports the classification of the Kerguelen and Crozet groups of islands as Subantarctic (J. C. Briggs 1974), with a fauna intermediate between that of the Cold Temperate South American Region and the Antarctic Region. As has been remarked by Naumov & Stepaniants (1962), it is not possible to draw a sharp line of demarcation between the fauna of the Antarctic and that of the Subantarctic.

There is at this stage a little evidence of a divergence between the fauna of the Kerguelen group on the one hand and the Crozet group on the other. Although they share 12 (42,9%) of the non-cosmopolitan species, 8 occur only in Kerguelen and 8 only in Crozet.

TABLE 2  
The distribution of the 33 species recorded in this paper.

	Crozet group	Kerguelen group	Magellan region	Bouvet Island	Marion & Prince Edward	Macquarie	Antarctica	South Africa	New Zealand/Australia
<i>Eudendrium rameum</i>	×	×	×						
<i>E. tottoni</i>		×	×				×		
<i>Modeeria rotunda</i>	×	×	×					×	×
<i>Opercularella belgicae</i>		×	×				×		
<i>Phialella chilensis</i>	×	×	×						×
<i>Halecium delicatulum</i>	×	×	×		×	×	×	×	×
<i>H. dufresneae</i>	×								
<i>H. jaederholmi</i>	×		×				×		
<i>H. tenellum</i>		×	×				×	×	×
<i>Hydrodendron arborea</i>	×	×	×		×		×		
<i>Filellum serratum</i>	×	×	×					×	×
<i>Grammaria abietina</i>	×	×	×						
<i>Halisiphonia ?nana</i>	×			×					
<i>Hebella striata</i>	×	×	×				×		
<i>Lafoea dumosa</i>		×	×			×	×	×	×
<i>Zygophylax crozetensis</i>	×	×							
<i>Campanularia norvegicae</i>		×	×						
<i>Silicularia rosea</i>	×	×	×		×	×			×
<i>Tulpa diverticulata</i>	×	×							×
<i>Staurotheca antarctica</i>	×		×				×		×
<i>S. dichotoma</i>	×	×	×		×		×		
<i>Sertularella geodiae</i>	×		×						×
<i>S. picta</i>	×	×	×		×				
<i>Symplectocyphus curvatus</i>	×						×		
<i>S. elongatus</i>	×	×	×				×		
<i>S. mawsoni</i>		×					×		
<i>S. plectilis</i>		×	×	×			×		
<i>S. subarticulatus</i>		×	×						×
<i>S. subdichotomus</i>	×	×	×				×		×
<i>Kirchenpaueria triangulata</i>		×						×	×
<i>Oswaldella bifurca</i>	×						×		
<i>Plumularia insignis</i>	×	×			×				
<i>Schizotricha unifurcata</i>		×	×	×			×		
Total (less cosmop.)	20	19	19	3	5	1	14	1	8
% (less cosmop.)	71,4	67,9	67,9	10,7	17,9	3,6	50,0	3,6	28,6

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